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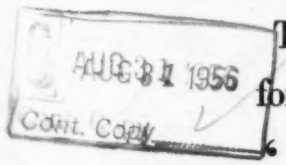
No. VII OF VOL. II, 1956 LONDON, SATURDAY, AUGUST 18, 1956 Pp. 104—Price 1s. 6d.
No. 6938 VOL. CCLXXI Founded 1823 PUBLISHED WEEKLY Registered as a Newspaper Annual Subscription: £3 3s.



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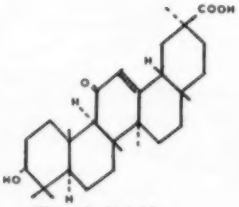

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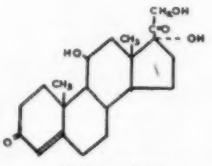

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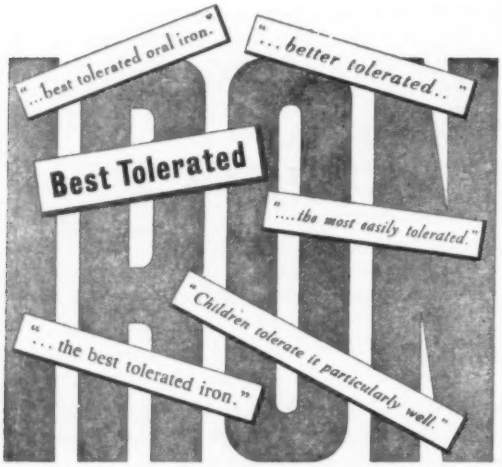

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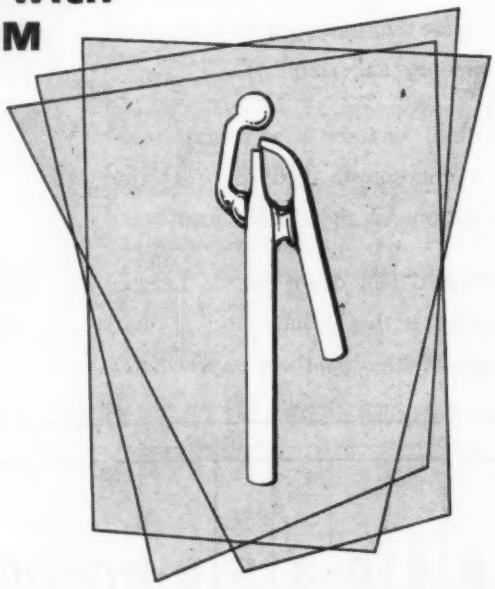

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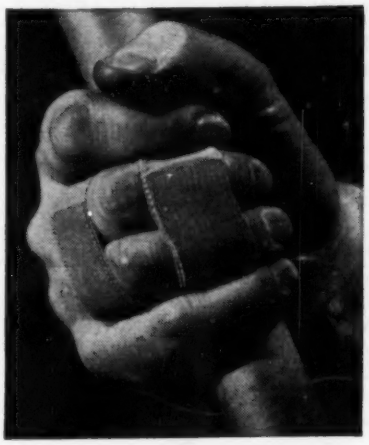

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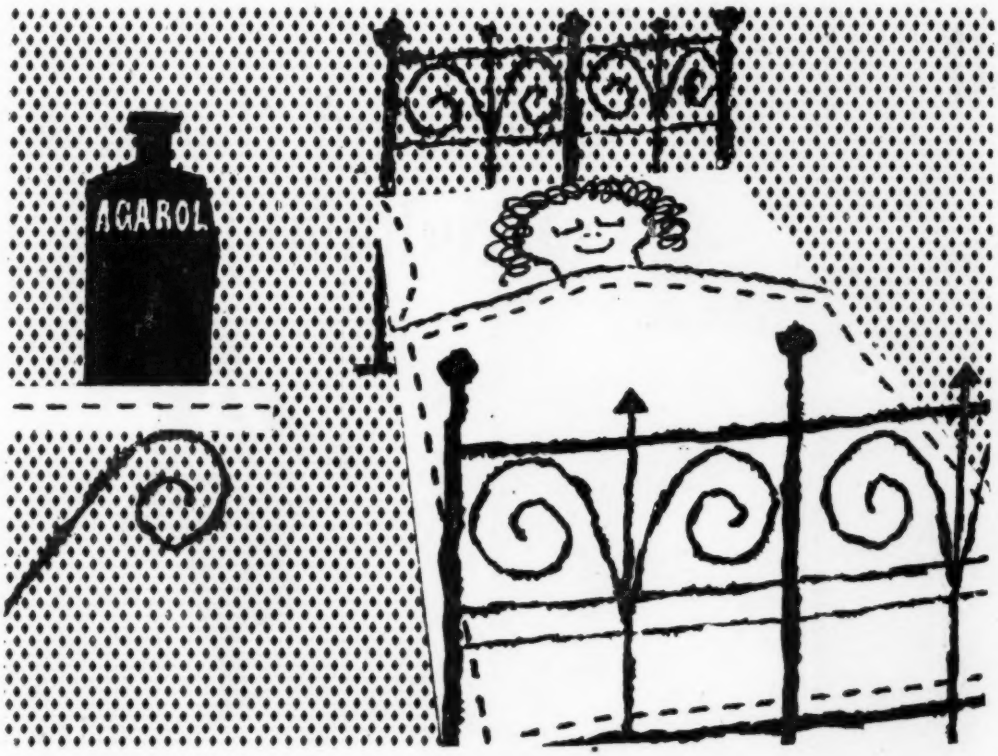

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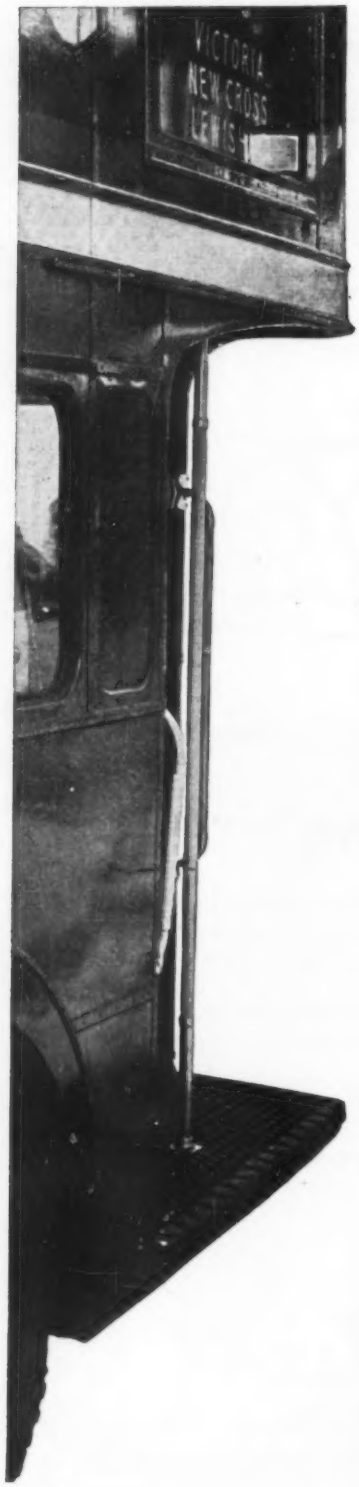

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Experimentally, by Warburg test, it has been shown that the inhibitory action of salicylate on tissue respiration is completely offset when it is combined with succinate. Succinate encourages cellular respiration and stimulates the respiratory enzyme systems. It is to this stimulating action that the beneficial effect of succinate is attributed.

*"*No abnormal prolongation of prothrombin time even after 68 days of succinate-salicylate.*" "*The results also show that this succinate-salicylate formulation combines safety and efficacy, permitting wide use both for treatment and maintenance without the excessive supervision required in many other forms of therapy.*" Delaware State Med. J., 1954, 26, 22.

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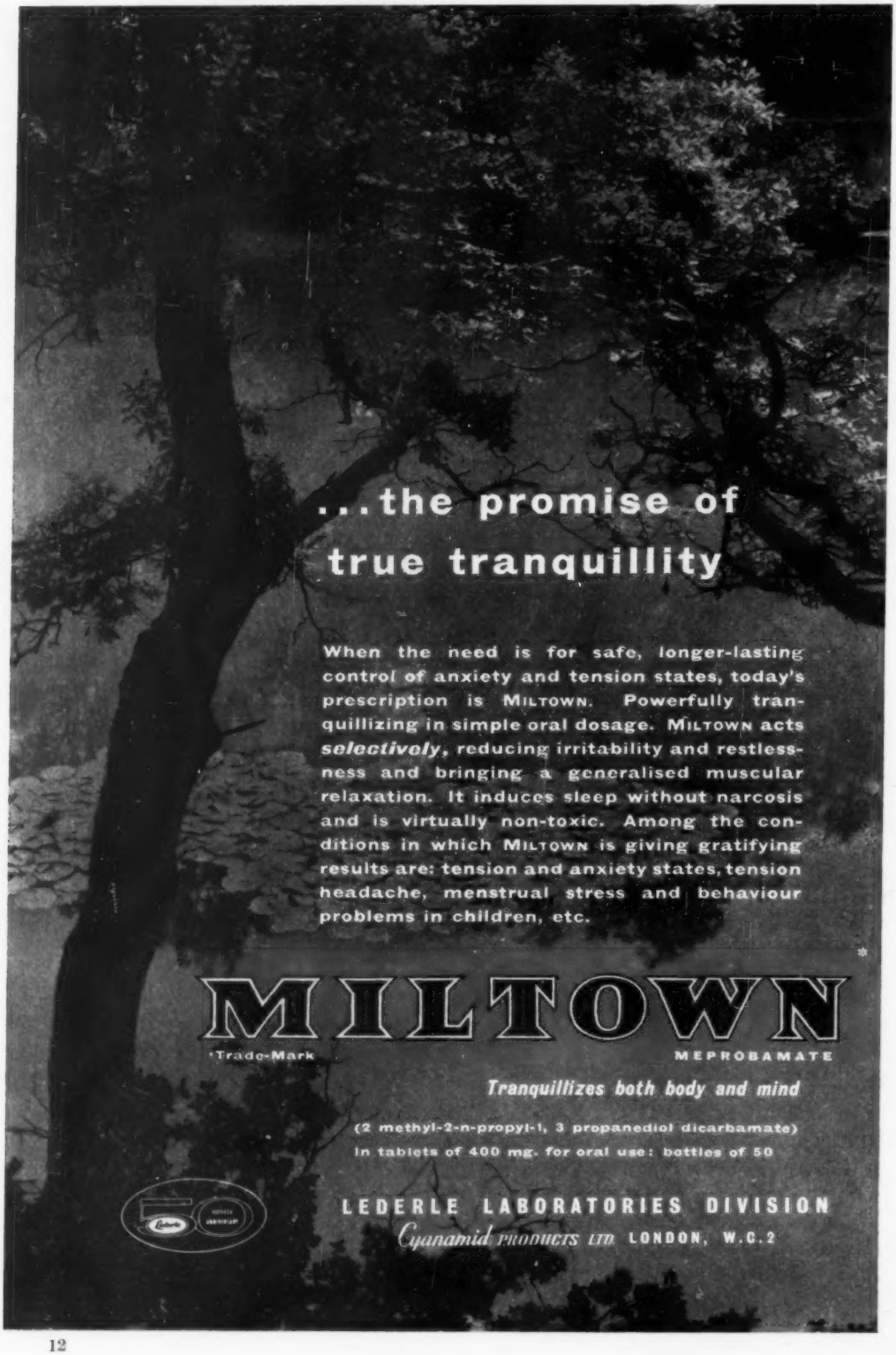
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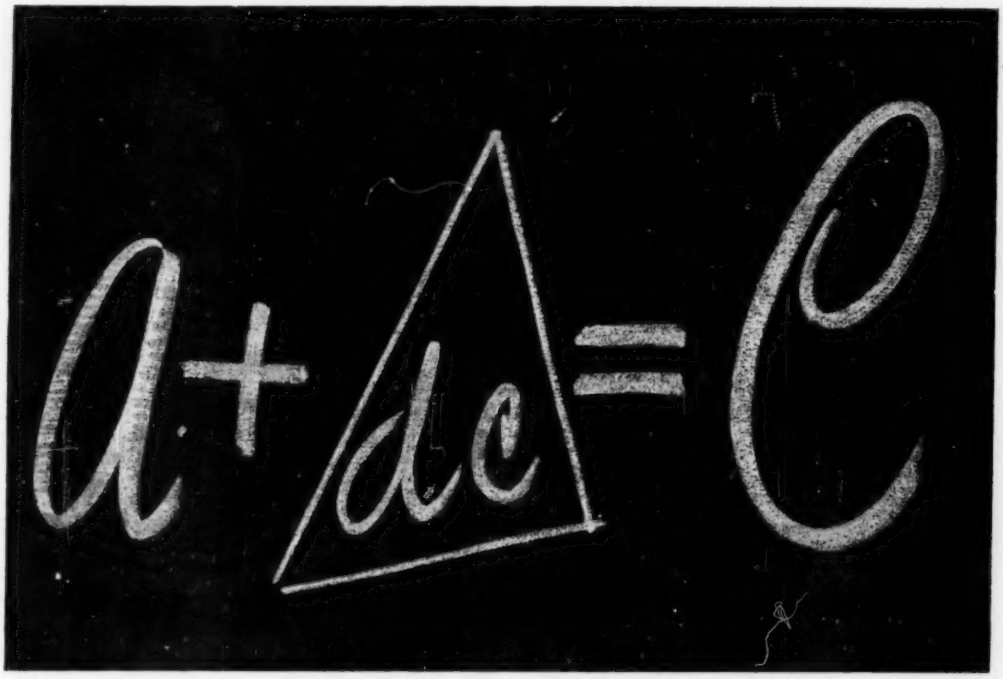

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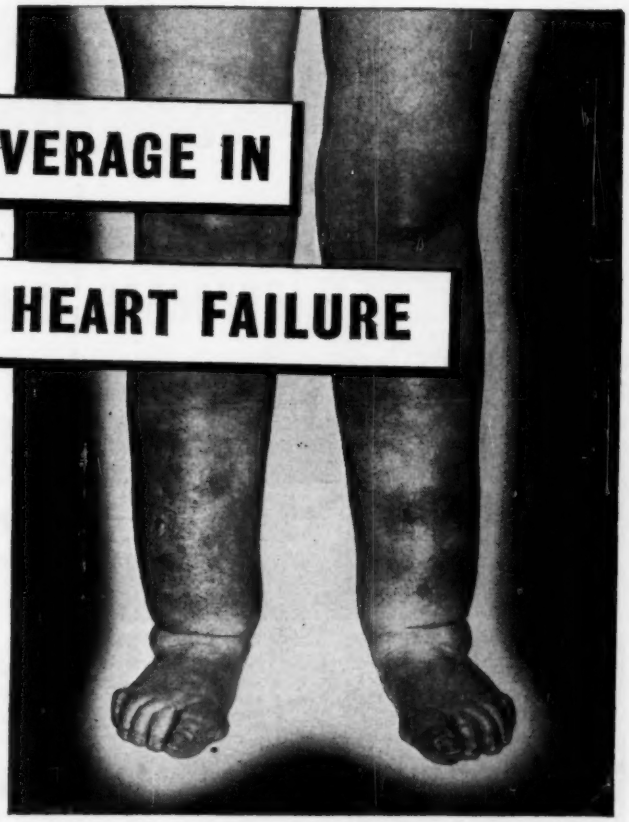

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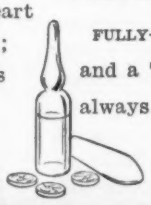

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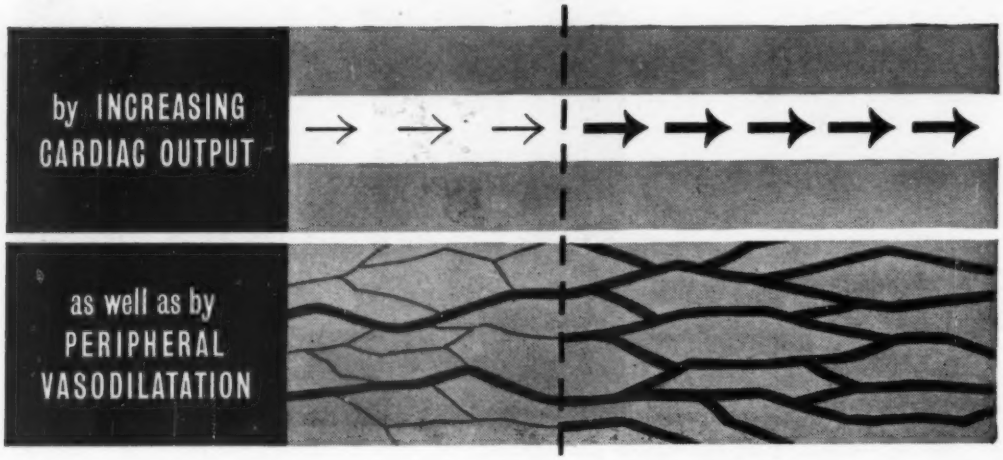
increases muscle blood flow



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Published work in this country and abroad (1) Lancet, 1956, **1**, 257, (2) Angiology, 1955, **6**, 190, (3) Angiology, 1955, **6**, 271, (4) Angiology, 1954, **5**, 314, indicates the value of Perdilatal in the treatment of intermittent claudication and associated vascular disorders. Perdilatal is a valuable addition to the overall therapy of peripheral vascular disease and its associated spasm.

INDICATIONS
peripheral vascular disorders, intermittent claudication, arteriosclerosis, labile hypertension, rheumatic conditions.

DOSAGE
oral—1-2 tablets four to six times daily.
parenteral—1-3 ampoules daily may be administered.

AVAILABILITY
tablets (2½ mg.) in containers of 100 and 500.
ampoules (5 mg. in 1 ml.) in boxes of 12.
*Perdilatal was formerly known as Dilatal.

The formula is: 1-(p-hydroxyphenyl)-2-(1'methyl-3'-phenyl-propylamino)-propanol-(1) hydrochloride.

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Neuro-muscular stimulation of the defaecation mechanism with restoration of natural rhythm

SENOKOT (the first standardised preparation of senna containing the total active constituents of the pod) is not a laxative in the usual sense. It restores large bowel sensitivity and reflex evacuation, and the general trend of therapy in the treatment of chronic constipation is the regular *administration of the dose required to give a comfortable motion. As natural rhythm is established, dosage is gradually reduced and finally discontinued.*

Brit. Ency. Med. Pract., Cum. Suppl. 1955 p. 79; Lancet, 1952, **1**, 655; ibid 1953, **1**, 497 and 602; Med. Press, 1954, **231**, 521; ibid 1954, **232**, 127; Pharm. J. 1951, **167**, 115; Practitioner 1953, **170**, 206.

GRANULES: 2 oz., 6 oz. and 2 lb.
TABLETS: 50, 200 and 1,000.
Prescribed under the N.H.S.:
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Granules: 1 - 2 teaspoonfuls. Tablets: 2 - 4.

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"The addition of 'Rauwiloid' makes 'Veriloid' easy to administer, more effective and practically does away with unpleasant side reactions".

Amer. J. Med., (1954) 17 : 629.

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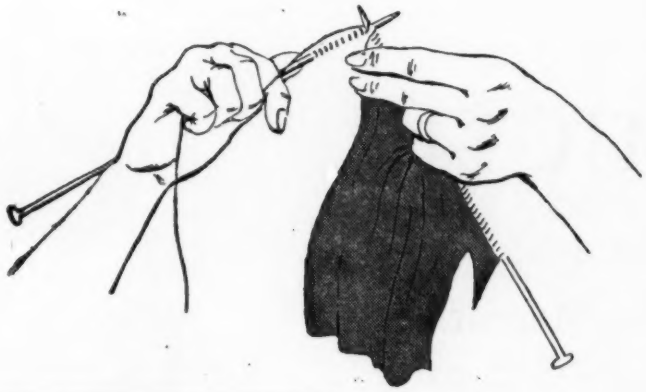

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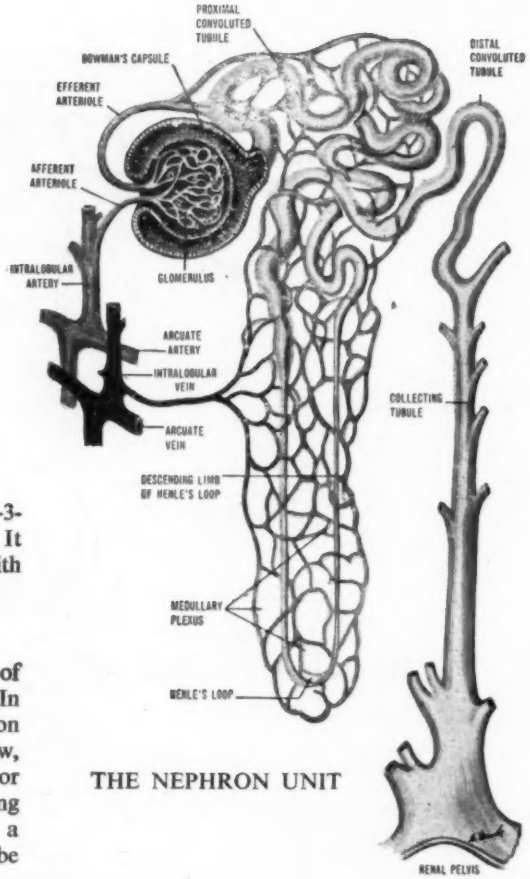

THE NEPHRON UNIT

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"Mictine," brand of aminometradine, is 1-allyl-3-ethyl-6-aminotetrahydropyrimidinedione. It avoids the undesirable side-effects associated with mercurial, xanthine or sulphonamide agents.

ACTION AND EFFECTIVENESS

"Mictine" is believed to act by inhibition of sodium ion absorption in the renal tubule. In therapeutic dosage it has not caused any effect on glomerular filtration rate, renal plasma flow, cardiac output, heart rate or blood pressure, nor any alteration in the blood or blood-forming tissues or in renal or hepatic function. In a group of unselected patients 70 per cent. may be expected to respond to "Mictine".

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"Mictine" is not toxic at therapeutic dosages. On the other hand, side-effects do occur such as headache and gastro-intestinal symptoms. These are reduced to a minimum if an interrupted dosage scheme is adopted.

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"Mictine" is indicated in the maintenance of an oedema-free state in any patient requiring diuretic therapy and the effecting of initial diuresis in all patients but those with severe congestive failure. For these purposes the dosage is one to four tablets daily in divided doses during meals on alternative days or on three successive days followed by four days without therapy. "Mictine" is not intended to produce initial diuresis in more severe congestive failure; however, "Mictine" may be given when other diuretics are contra-indicated, or if tolerance to them has developed.

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40 or 80 units per c.c.

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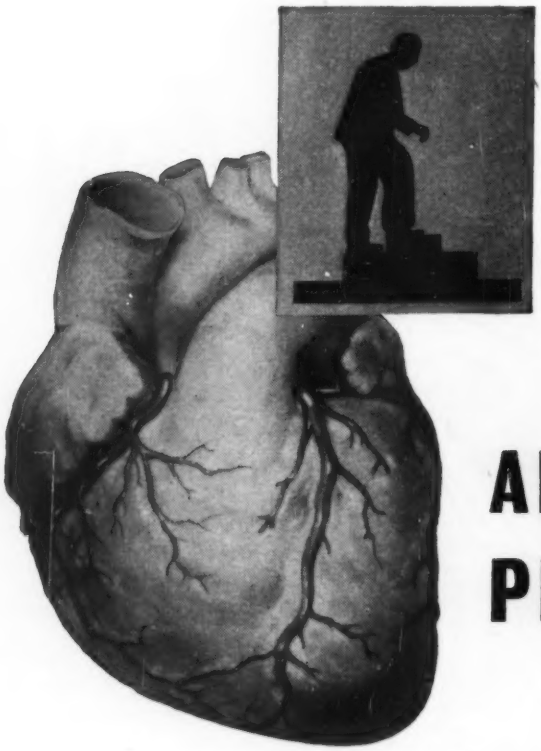

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*MYCARDOL is a long-acting nitrite used in the routine control of angina pectoris. It gives prolonged protection against severe attacks, improves exercise tolerance and reduces the need for repeated doses of trinitrin—in some cases eliminating it altogether. Low toxicity makes this drug especially suitable for continuous long-term symptomatic treatment.

* *pentaerythritol tetranitrate.*

Mycardol

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Children like it... worms don't

One week's treatment with 'Antepar' Elixir is usually sufficient to eradicate *threadworms*. A single dose clears *roundworms* from the gut. Effective without fasting, purging or supporting measures, 'Antepar' acts by paralysing the worms—they are then expelled by normal peristalsis.

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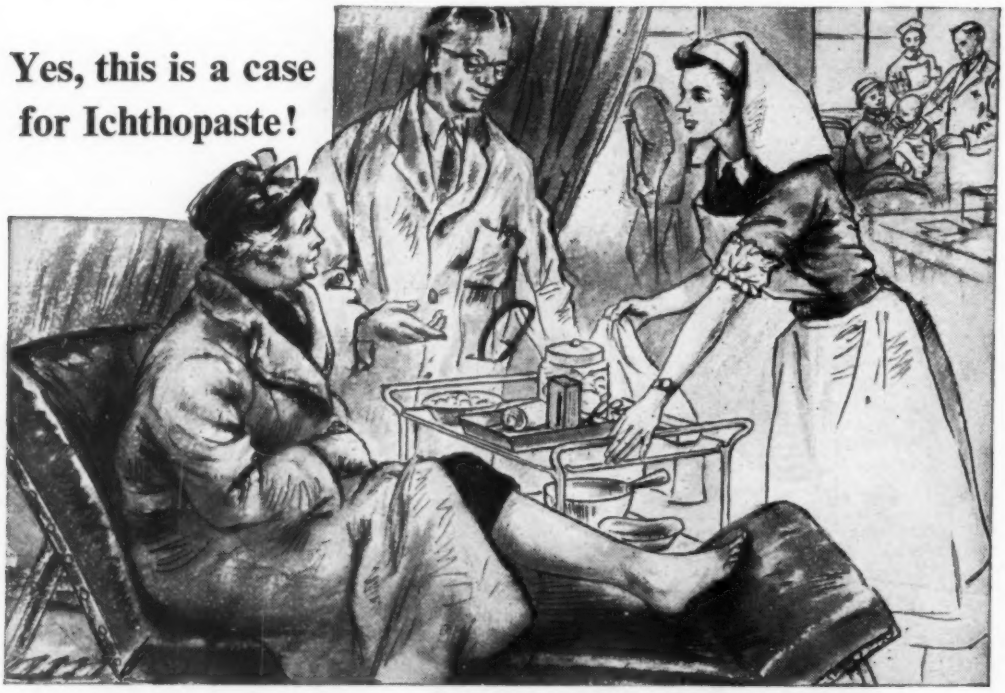

Ulceration of the leg with associated eczema . . . yes, this is a case for Ichthopaste! But this is only one of the complete range of Smith & Nephew paste bandages available (on E.C.10) to the Medical Profession. The paste content of these bandages is particularly high, being four times the weight of their fabric base.

Ichthopaste

ZINC PASTE AND ICHTHAMMOL BANDAGE B.P.C

This bandage contains 2% of Ichthammol. It is indicated for eczematous conditions associated with leg ulceration, particularly when the eczema is of the weeping type. The bandage never sets harder than its original spongy state which gives a resilient dressing. An Elastocrepe or Elastoplast bandage may be applied to give firm elastic support.

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A zinc paste bandage which requires no preliminary heating and is ready for immediate use on removal of the waterproof wrapper. Viscopaste sets quickly, forming a thin shell and is indicated for eczematous conditions and also as a support for the leg following the removal of P.O.P. casts.

COLTAPASTE

ZINC PASTE AND COAL TAR BANDAGE B.P.C

Made from light cotton fabric, evenly impregnated with a water miscible coal tar zinc oxide paste. Coltapaste is indicated for the dry, scaly, itching type of eczema associated with varicose conditions, infantile eczema and neurodermatoses. Here is an ideal medium for the application of prepared coal tar to the skin, wherever its use is indicated.

S&N SMITH & NEPHEW LIMITED

WELWYN GARDEN CITY · HERTS

TREATMENT OF NEPHROTIC SYNDROME WITH CATION-EXCHANGE RESINS AND HIGH-PROTEIN LOW-SODIUM DIET

M. L. ROSENHEIM
C.B.E., M.D. Camb., F.R.C.P.
DIRECTOR

A. G. SPENCER
G.M., M.D. Lond., M.R.C.P.
FIRST ASSISTANT

MEDICAL UNIT, UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, LONDON

CATION-EXCHANGE resins have been widely used to control the œdema of congestive cardiac failure. The details of resin therapy, the latent dangers associated with their use, and the mechanisms of their action have been fully described in previous papers from this unit (Ross and Spencer 1954, Spencer and Lloyd-Thomas 1954, Spencer et al. 1954).

Although cation-exchange resins have been used in the treatment of the nephrotic syndrome, many of the published reports refer only to a few cases (Emerson et al. 1951, Mateer et al. 1951, Kattus 1952, Wood et al. 1952) and others only to brief treatment (Payne and Wilkinson 1951). Lippman (1951) treated 14 patients with the nephrotic syndrome and obtained excellent diuresis in 11, most of whom remained virtually free from œdema for up to a year. He used intermittent courses of treatment and noted no specific effect on the renal lesion in any patient. Weston et al. (1953) successfully maintained a nephrotic patient on intermittent resin therapy for two years, and McDonald and Palmer (1953) treated a woman, aged 39, for four months, with the eventual disappearance of protein from the urine, restoration of blood chemistry to normal, and apparent recovery.

During the past six years we have used ion-exchange resins, in association with diet, as the main method of controlling œdema in the nephrotic syndrome and have treated patients over long periods with outpatient control. We have been impressed by the ease and safety of the treatment and with its effectiveness as a means of controlling œdema. During this period we have observed a somewhat unexpected number of remissions of the syndrome.

Material

13 patients with the nephrotic syndrome were treated with ion-exchange resins for six weeks or more, the longest period of treatment being twenty months. During the same period 4 other patients received resins for shorter periods:

In 1 of these a short trial of the resins early on in their use did not produce a rapid response and it was stopped; it has recently been re-started.

In 1 other patient treatment was stopped because of coexistent renal failure and the development of acidosis.

1 patient left England much improved after a short period of treatment.

1 patient started to have the treatment as an outpatient, was much improved after a month, and did not attend further.

All 13 patients presented with severe albuminuria and œdema. Their plasma-albumin levels were always initially low, and in 11 of these patients serum-electrophoresis showed the characteristic changes of diminished albumin and γ-globulin and increased α_2-globulin levels. The initial plasma-cholesterol levels were raised in 12 of the 13 patients. 8 of these patients appeared to be typical cases of Ellis type-II nephritis, but in the remaining 5 other factors were probably responsible for the nephrotic syndrome (see table). Diabetic nephropathies are not included in this series, though we have used exchange resins in such patients. The patients were aged 10–57. 2 of them, a boy aged 10 years (case 1) and a woman aged 44 (case 5), had had previous attacks of the syndrome with intervening periods of good health. In the other 11 patients, although the œdema had fluctuated, proteinuria had always been present.

A brief clinical report of case 5 has been presented elsewhere (Lloyd-Thomas 1953, Spencer and Lloyd-Thomas 1954).

Methods

The resin mainly used in these studies has been a polystyrene sulphonate, 'Zeo-Karb 225.' This was originally given in the hydrogen phase but is now marketed in a palatable form, 75% in the ammonium and 25% in the potassium phase ('Katonium,' B.D.H.). The adult dose has been 15 g. four times a day (60 g. daily), and none of our patients has recently had any difficulty in taking this dose. It is now our custom to give the resin for five or six days continuously and to omit it at the week-end, when the patient takes extra potassium (potassium citrate 3 g. daily).

Treatment has usually been started with the patient in hospital, but with increasing experience we would now be willing to commence outpatient treatment, provided that the blood-urea level was normal, and that the patient could attend regularly for clinical and biochemical observation. During the early stages of the treatment biochemical control is required weekly, but monthly observation is satisfactory once treatment has been established. Though it is difficult to formulate exact instructions for the care of the individual patient, we consider that treatment with the exchange resins and a high-protein low-salt diet should be discontinued if the blood-urea level rises above 75 mg. per 100 ml., if the serum-potassium level falls below 3·6 m.eq. per litre, or if the plasma-bicarbonate level is below 15 m.eq. per litre. After correction of the metabolic disorder it may prove possible to start resin therapy again.

Close attention to the diet is of great importance. The patient is given a 2500–3000 calorie diet containing 120–180 g. of protein and less sodium than the equivalent of 2 g. of sodium chloride. Such a high-protein low-salt diet can only be managed by the daily and regular use of low-sodium preparations of protein—e.g., 'Casilan' and 'Edosol.' Here the services of a dietitian are invaluable. The efficiency of exchange-resin therapy is greatly increased by the daily use of a non-mineral non-oily laxative (Spencer and Lloyd-Thomas 1954).

During the period under review cortisone and corticotrophin were not used in any of our patients. At present, 2 of our patients whose disease has progressed despite resin therapy (cases 8 and 10) are being treated with cortisone. One of these has recently been shown to have disseminated lupus erythematosus.

Mechanism of Action

Studies with ^{24}Na and ^{42}K in man and in the rat (Spencer et al. 1954, Ross and Spencer 1954) have shown that a series of dynamic equilibria are established between cations on the exchange resin and those in the intestinal fluids. These transfers are continuous throughout the length of the gut, but the rates of exchange are very different at each functional intestinal level. The net result is that the resin exchanges its ammonium and part of its potassium for sodium ions during its passage through the small intestine, only to have most of this sodium exchanged for potassium in the colon. The net gain of potassium and sodium by the resin in exchange for ammonium ion, which the body absorbs and converts to urea and hydrogen ion, produces acidosis. The healthy kidney responds by excreting a highly acid urine and by an increased rate of ammonium ion synthesis. In

œdematous patients with good renal function this acidosis causes a considerable increase of sodium in the urine as well as in the fæces.

When renal function is poor, such that the kidneys cannot make an acid urine by hydrion exchange nor synthesise ammonia at a sufficient rate, the administration of exchange resin causes acidosis, and secondary extrarenal uræmia may supervene. Continued loss of potassium in the stools may lead to hypokalæmia.

Results

The results of resin treatment in 13 patients with the nephrotic syndrome are shown in the accompanying table.

In all 13 cases there was a considerable loss of weight and clinical œdema disappeared completely. A delay sometimes occurs before diuresis and weight-loss begin, and treatment must still be given vigorously, unless biochemical or other contra-indications appear. Case 1 had gross ascites at the start of treatment, progress was slow, and it was felt that the ascites should be tapped. Before this could be done, improvement suddenly began, and he lost 2 stone in the next four weeks.

It is well recognised that the nephrotic syndrome, especially where the ætiology is obscure (lipoid nephrosis, Ellis type-II nephritis), is liable to remission and relapse. Œdema is normally evidence of a much lowered plasma-albumin level, but proteinuria may be present for months

CLINICAL AND BIOCHEMICAL PROGRESS

Case no., sex, and age (yr.)	Diagnosis	Treatment period	Clinical			Serum			Urine			Result
			Œdema	Ascites	Blood-pressure (mm. Hg)	Albumin (g. per 100 ml.)	Globulin (g. per 100 ml.)	Cholesterol (mg. per 100 ml.)	Urea (mg. per 100 ml.)	Protein (g. per 100 ml.)	Urea clearance (%)	
1 M 10	Type-II nephritis	Initial	++++	++++	124/80	0·6	3·7	1330	39	2·0	45	Lost all œdema and 35 lb. wt., urine practically free from protein, serum-albumin level normal (fig. 6)
		4 mos. resin ..	0	0	110/70	1·8	2·6	630	27	0·8	45	
		18 mos. resin ..	0	0	110/70	3·7	1·9	185	21	0·04	120	
		6 mos. off resin (normal diet)	0	0	120/65	4·2	2·1	223	36	0·07	81	
2 F 35	Type-II nephritis	Initial	+++	0	190/110	1·9	2·4	620	36	0·8	65	Lost all œdema and 18 lb. wt., urine protein-free, serum-albumin level normal (fig. 7)
		6 wks. resin ..	0	0	130/80	3·1	2·0	320	30	0·3	91	
		6 mos. off resin..	0	0	130/80	5·1	1·6	..	21	0	..	
		3 yr. off resin (normal diet)	0	0	110/80	4·8	1·7	230	..	0	..	
		4 yr. off resin (normal diet)	0	0	170/110	4·8	1·6	231	24	0	74	
3 M 26	Type-II nephritis	Initial	+++	++	135/90	1·7	2·4	755	24	1·0	121	Lost all œdema and 28 lb. wt., urine protein-free, serum-albumin level normal (fig. 8)
		2 mos. resin ..	0	0	130/80	2·0	2·6	567	30	0·2	..	
		12 mos off resin	0	0	138/68	5·4	2·6	255	42	0	..	
		16 mos. off resin (normal diet)	0	0	140/85	4·8	2·1	232	30	0	102	
4 M 14	Type-I nephritis (nephrotic stage)	Initial	++++	+++	125/80	1·4	2·5	850	21	6·0	51	Lost all œdema and 52 lb. wt., urine almost protein-free, serum-albumin level normal (fig. 9)
		2 mos. resin ..	0	0	130/80	2·4	2·6	656	24	0·8	..	
		6 mos. resin ..	0	0	130/80	2·3	2·4	..	..	0·5	..	
		12 mos. resin ..	0	0	148/80	4·2	2·1	437	..	0·3	..	
		18 mos. resin ..	0	0	145/80	5·1	2·3	..	27	0·01	110	
		6 mos. off resin..	0	0	140/80	4·8	2·5	165	27	0·01	113	
5 F 44	Type-II nephritis	Initial	++++	+++	110/70	1·8	2·0	795	33	1·2	83	Lost all œdema and 32 lb. wt., urine protein-free, serum-albumin level normal
		2 mos. resin ..	+	0	..	2·3	1·5	650	24	0·6	..	
		6 mos. resin ..	0	0	175/90	4·7	2·1	265	24	0·02	..	
		1 yr. off resin ..	0	0	120/60	5·0	2·3	232	30	0	74	
		3 yr. off resin (normal diet)	0	0	150/90	4·2	2·4	..	..	0	..	
6 F 39	Nephrotic syndrome and mitral valvotomy	Initial	++	++	135/115	2·8	2·5	190	30	0·8	67	Lost all œdema and 31 lb. wt., urine and serum almost normal
		2 mos. resin ..	0	0	130/90	..	..	..	..	0·4	..	
		6 mos. resin ..	0	0	130/90	3·9	2·5	..	..	0·2	..	
		1 yr. off resin ..	0	0	140/90	3·9	2·2	..	30	0·1	..	
		2 yr. off resin ..	0	0	140/90	4·2	2·6	..	..	0·1	..	
7 M 49	Type-II nephritis	Initial	+++	++	150/100	2·1	2·4	585	21	0·4	..	Lost all œdema and 32 lb. wt. Recurred; lost œdema and 21 lb. wt., proteinuria persists
		2 mos. resin 60 g.	0	0	140/80	3·3	2·5	467	..	0·6	..	
		6 mos. resin 20 g.	++	0	150/90	2·2	2·5	440	30	1·0	80	
		2 mos. resin 60 g.	0	0	140/110	2·7	2·1	400	48	1·0	..	
8 M 31	Type-II nephritis	Initial	++	0	140/80	2·2	1·7	385	57	0·8	42	Lost all œdema and 24 lb. wt., proteinuria persists, blood-urea level rising
		1 mo. resin ..	0	0	140/80	2·3	1·1	..	45	0·8	..	
		6 mos. resin ..	0	0	140/80	2·2	1·3	440	66	1·2	..	
9 M 49	Type-II nephritis	Initial	++	0	148/90	2·2	2·3	465	30	0·8	90	Lost all œdema and 16 lb. wt., proteinuria persists
		1 mo. resin ..	0	0	160/80	2·6	2·3	450	21	0·8	89	
		20 mos. resin ..	0	0	180/90	2·5	2·7	426	27	0·8	89	
10 M 53	Nephrotic syndrome and D.L.E.*	Initial	++++	++++	210/160	1·3	2·1	345	21	1·0	89	Lost all œdema and 56 lb. wt., proteinuria persists, relapse, lost all œdema again
		2 mos. resin ..	0	0	170/96	2·4	2·0	..	..	0·6	..	
		12 mos. off resin	++	+	180/110	1·5	2·0	255	..	1·6	..	
		2 wks. on resin..	0	0	185/100	1·5	2·4	257	24	1·6	94	
11 M 49	Nephrotic syndrome († D.L.E.*)	Initial	++	0	120/80	2·1	2·3	400	24	0·4	88	Lost all œdema and 16 lb. wt., proteinuria persists
		3 mos. resin ..	0	0	140/75	2·7	2·0	327	26	0·4	99	
12 M 19	Type-II nephritis	Initial	++	0	160/100	2·8	2·1	..	19	2·0	103	Lost all œdema, proteinuria persists
		1 mo. resin ..	0	0	150/100	..	..	..	..	..	..	
		8 mos. resin ..	0	0	140/115	2·4	2·1	394	..	1·0	..	
13 M 57	Nephrotic syndrome († D.L.E.*)	Initial	++++	++	190/110	1·4	2·0	450	45	1·0	18	Lost all œdema and 61 lb. wt., proteinuria persists
		2 mos. resin ..	0	0	190/110	1·8	2·0	..	84	0·4	18	
		12 mos. resin ..	0	0	190/120	2·2	2·0	360	90	0·5	17	

* D.L.E., disseminated lupus erythematosus.

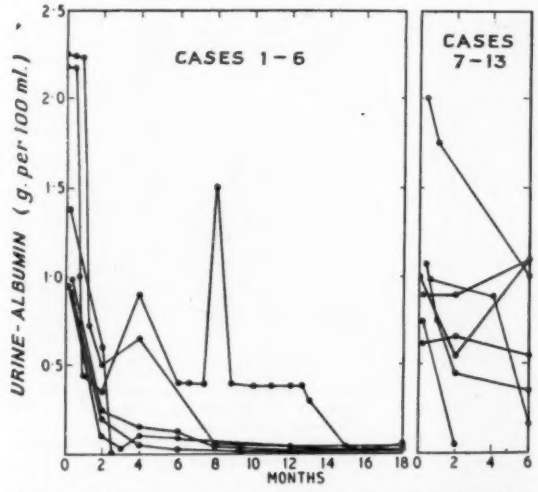


Fig. 1—Rapid decrease of proteinuria in cases 1–6, compared with either improvement or lack of response in cases 7–13.

or years before œdema draws attention to the disorder. Disappearance of the œdema under treatment, whether produced by rest in bed, diet, diuretics, cortisone or resins, cannot be regarded as a true remission while proteinuria is present, while the plasma-albumin level remains low, or if the œdema reappears when treatment is stopped.

While all our patients responded with a satisfactory loss of weight and of œdema, it has been possible to divide them into two groups according to their progress under treatment. The results in these two groups are contrasted in figs. 1–3.

In 6 of the 13 patients proteinuria diminished, the plasma-albumin level rose, and it was possible to stop the resin treatment and to revert to a normal diet. They remained free from œdema for from nine months to four years. The urine of 3 of these 6 patients is protein-free and completely normal; that of the others contains less than 0·1 g. of protein per 100 ml. (1 part per 1000).

In the remaining 7 cases the plasma-albumin level is still low. In 4 of these patients the resins were stopped or reduced while the œdema was well controlled: in 1 case because of a low plasma-potassium level, in 2 because of acidosis and renal failure, and in 1 through a misunderstanding. In 3 of these 4 œdema reappeared and treatment with resins was restarted. In 1 œdema has remained minimal without further treatment, but the blood-urea level is rising.

In 5 of the 6 patients who have shown this great improvement the syndrome was fully developed at the time of starting treatment: figs. 1 and 2 show the rapid decrease in proteinuria and the associated rise in the plasma-albumin level. The plasma-cholesterol level also fell to normal (fig. 3). When these results are contrasted with the rest, it seems that those patients with initially heavy proteinuria and high plasma-cholesterol levels have responded best to treatment. In 4 of the patients who have responded well a serious prognosis had been given elsewhere.

Of the 7 patients in whom the plasma-albumin level has not reached 4 g. per 100 ml. case 11 is still improving, 5 other patients have hypertension and the disease is probably progressing, and 1 is clinically well but has a raised blood-urea level.

Illustrative Case-reports

Case 1.—A schoolboy, aged 10 years, was first admitted to University College Hospital in April, 1954, with recurrent œdema dating back to 1947, when he gradually developed generalised œdema, which persisted with variations for eighteen months and then cleared completely. There was no history of acute nephritis. The œdema recurred after a few months, and cleared again after malaria therapy in another hospital. In 1951 he was fit and his urine was free from protein, but in the summer of 1953 the œdema returned and became extreme.

On admission in April, 1954, he was small for his age and had considerable œdema and very gross ascites with splaying of the ribs (fig. 4*a*). His blood-pressure was 124/80 mm. Hg. Radiography showed a left pleural effusion. His urine contained protein 2·0 g. per 100 ml. and occasional red cells and casts. His serum-albumin was 0·6 g. per 100 ml., serum-cholesterol 1330 mg. per 100 ml., and the serum-electrophoretic pattern was characteristic of the nephrotic syndrome (fig. 5).

Treatment with cation-exchange resins was begun in April, 1954. In the first week he lost only 2 lb., but during the next four weeks he lost 32 lb. and the ascites and œdema almost cleared. He was discharged on resin treatment and a high-protein low-salt diet, and attended school regularly. His further progress is shown in fig. 6. In February, 1955, after nine months' resin therapy, he was very fit and free from œdema and ascites. The urinary protein had decreased to 0·09 g. per 100 ml.; his serum-albumin was 2·4 g., and

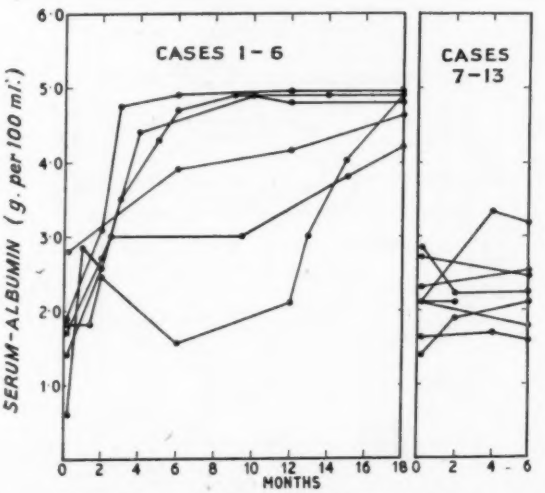


Fig. 2—Rise of serum-albumin levels in cases as in fig. 1.

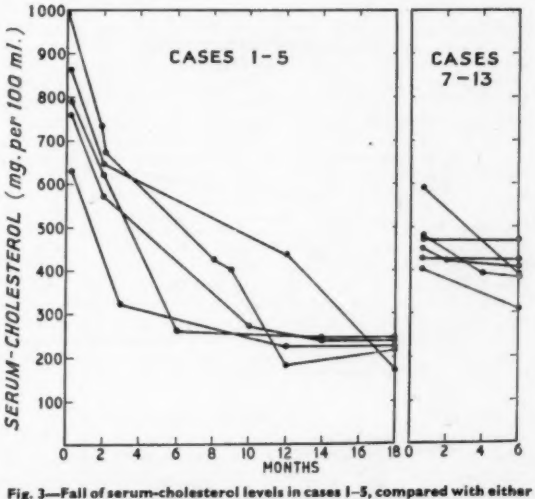
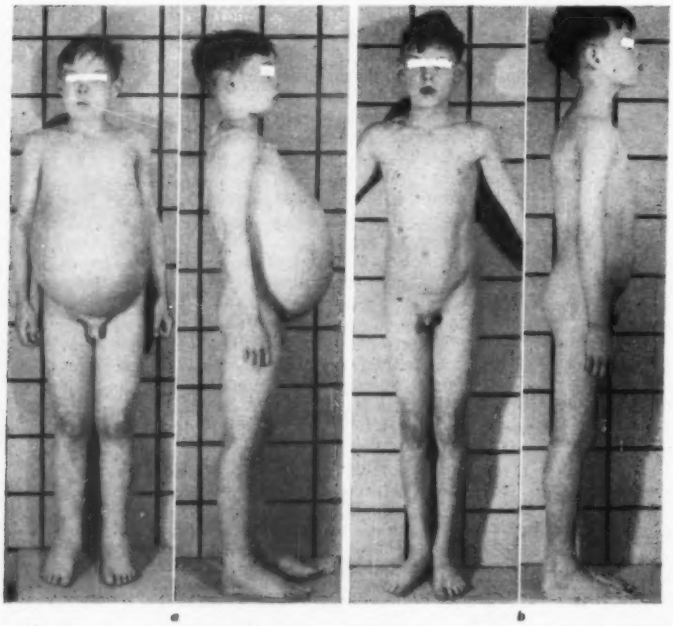


Fig. 3—Fall of serum-cholesterol levels in cases 1–5, compared with either improvement or lack of response in cases 7–13.



a *b*

Fig. 4—Case 1 : *a*, on April 8, 1954, before treatment ; *b*, on Feb. 1, 1956, six months after exchange-resin therapy had been stopped.

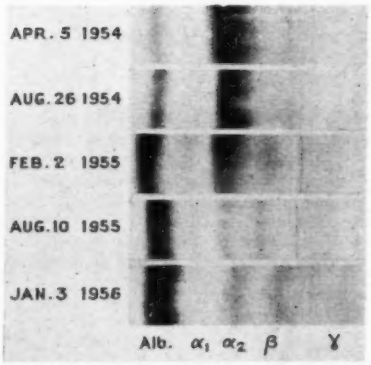


Fig. 5—Electrophoretic patterns of serum in case 1 : initial pattern is characteristic of nephrotic syndrome (decreased albumin, increased α_2-globulin, and decreased γ-globulin) ; ultimate pattern normal.

serum-cholesterol 242 mg., per 100 ml. His serum-calcium had fallen to 5·8 mg. per 100 ml., but there was no subclinical tetany, and radiography showed normal ossification and no evidence of rickets. The resin was reduced from 45 to 30 g. daily and he was encouraged to drink more milk. Resin therapy was stopped in August, 1955, after seventeen months' treatment. When last seen in January, 1956, the boy was fit, free from œdema, and still taking a high-protein but normal-salt diet. He was growing (fig. 4*b*). His blood-pressure was 130/60 mm. Hg, serum-albumin 4·2 g. per 100 ml., serum-cholesterol 223 mg. per 100 ml., and the serum-electrophoretic pattern was almost normal (fig. 5). The urea-clearance was 81%, and his urine was microscopically normal.

Case 2.—A housewife, aged 35, with a nine months' history of œdema of insidious onset. Except for a mild toxæmia of pregnancy six years before, there was no preceding history of renal disease. She had been diagnosed as having subacute nephritis in another hospital and, the response to treatment being poor, had been given a gloomy prognosis.

On admission to University College Hospital in July, 1952, she had moderate œdema of the legs and sacrum, and her blood-pressure was 190/110 mm. Hg. The investigations summarised in the table established the diagnosis of the nephrotic syndrome, and the electrophoretic pattern of the serum was typical. The urine deposit contained only a few red cells and no casts.

Treatment was begun with a low-salt high-protein diet, but, as the œdema persisted, resin therapy ('Carboresin') was started. In six weeks the œdema resolved and the patient's weight fell by 18 lb. Resin therapy was then stopped. Her subsequent progress is shown in fig. 7. By October, 1952, the urinary protein had decreased from 0·8 to 0·06 g. per 100 ml., the serum-albumin had risen from 1·9 to 3·5 g. per 100 ml., and there was no œdema. The urine became free from protein for the first time in March, 1953, when the serum-albumin was 4·8 g. per 100 ml. When last seen in January, 1956, she was very fit, free from œdema, and her serum-cholesterol and serum-protein levels and the electrophoretic pattern were normal ; there was no proteinuria, and the urine contained no red cells or casts. The only abnormality detected

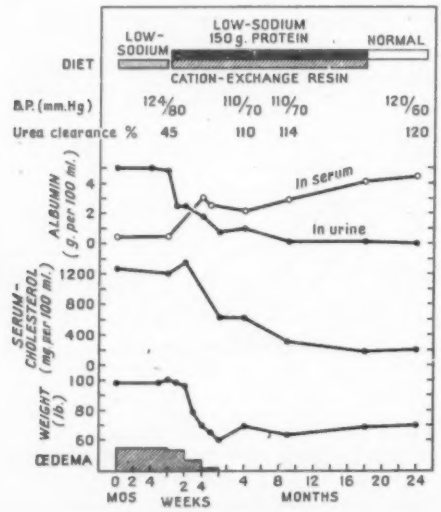


Fig. 6—Chart of case 1.

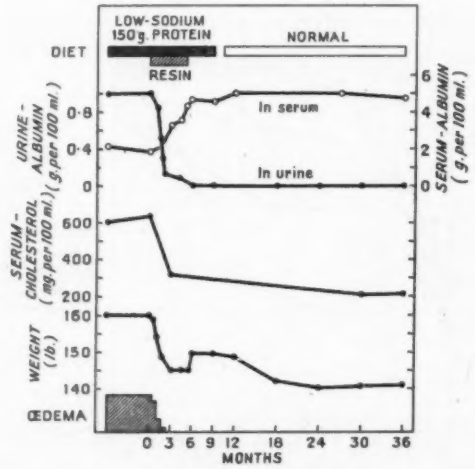


Fig. 7—Chart of case 2.

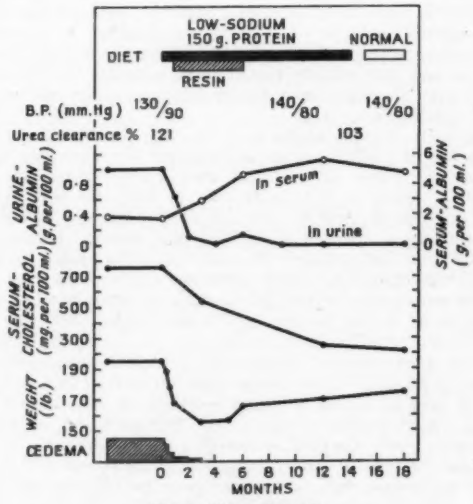


Fig. 8—Chart of case 3.

was a blood-pressure of 170/110 mm. Hg and a urea-clearance of 74%.

Case 3.—A salesman, aged 26, noticed in March, 1954, the gradual onset of œdema. By April it had become gross, and he was admitted to another hospital. He was found to have heavy proteinuria and a serum-albumin of 2·5 g. per 100 ml. His œdema improved during four weeks' hospital treatment on a high-protein low-salt diet, but the proteinuria persisted. Shortly after discharge his œdema recurred and he gained about 17 lb. in weight. There was no preceding history of infection, renal disease, or drug therapy. He had psoriasis.

On admission to University College Hospital in 1954 he had considerable œdema, slight ascites, and small bilateral pleural effusions. His blood-pressure was 135/90 mm. Hg and the fundi were normal, except that the retinæ appeared shiny. His urine, blood chemistry, and the electrophoretic pattern of the serum were typical of the nephrotic syndrome (see table). With rest in bed and a low-salt diet he lost most of his œdema, but the proteinuria continued and his plasma-albumin level remained low. He was therefore started on exchange resin therapy on July 6, 1954, and discharged on July 16, 1954.

He returned to work and, except for a trace of ankle swelling on one visit, his œdema did not recur (fig. 8). By October, 1954, his plasma-albumin had risen to 4·4 g. per 100 ml., and his urine contained no protein, red cells, or casts. Resin treatment was discontinued in November, 1954, after three and a half months, and he later returned to a normal diet. In January, 1956, more than a year after the end of all treatment, his urine was free from protein, casts, and red cells, his serum-albumin was 4·8 g. per 100 ml., his serum-cholesterol was 232 mg. per 100 ml., and the serum-electrophoretic pattern had returned to normal. The urea-clearance was 113% and blood-pressure 140/85 mm. Hg. He had lost no time off work since leaving hospital.

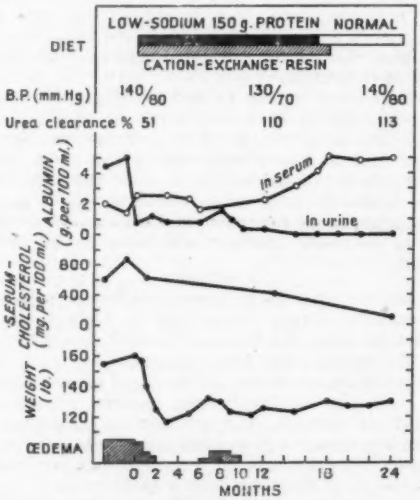


Fig. 9—Chart of case 4.

Case 4.—A schoolboy, aged 14, had acute nephritis following a sore throat in January, 1953. In February he was admitted to another hospital with generalised œdema and a blood-pressure of 140/80 mm. Hg; his urine contained red cells, numerous casts, and much protein. His serum-albumin was 4·5 g. per 100 ml. With rest in bed his œdema and proteinuria improved, but the urine still contained protein on his discharge in March, 1953. His œdema increased, and he was readmitted in July, 1953, when his proteinuria was 0·6–1·4 g. per 100 ml. and his serum-albumin 2·8 g. per 100 ml. After four months in hospital he was transferred to University College Hospital in January, 1954, with minimal œdema and a blood-pressure of 130/80 mm. Hg. His urine contained protein 0·3–0·6 g. per 100 ml., the serum-albumin was 3·3 g. per 100 ml., the serum-cholesterol 388 mg. per 100 ml., and his electrophoretic pattern was typical of the nephrotic syndrome. This was considered to have followed acute glomerular nephritis, and a serious prognosis was given. In the absence of œdema no special treatment was ordered.

Two months later he was readmitted with gross œdema, ascites, and a right pleural effusion. The blood-pressure was 135/80 mm. Hg, and his fundi were normal. The urine contained protein 6 g. per 100 ml., occasional red cells, and numerous granular casts. His plasma-albumin had fallen to 1·4 g. per 100 ml and his serum-cholesterol had risen to 850 mg. per 100 ml. He was treated with exchange resins from March 11, and by the end of that month he had lost all his œdema and 3 stone in weight. His further progress is shown in fig. 9 and the table.

Exchange-resin therapy was continued as an outpatient. Although the œdema was well controlled, the plasma-albumin level remained low, and proteinuria persisted. After nine months' treatment there was a short exacerbation with a return of slight œdema, increase in proteinuria, and a fall in the serum-albumin concentration. After this he improved and was encouraged to take a job. From May, 1955, onwards there was no œdema and the urinary protein decreased to 0·01 g. per 100 ml.

After eighteen months, in October, 1955, resin treatment was discontinued, and in January, 1956, he was fit and œdema-free, and his blood-pressure was 140/80 mm. Hg. The urine contained less than 0·01 g. protein per 100 ml., plasma-albumin was 4·8 g. per 100 ml. with a normal electrophoretic pattern, serum-cholesterol 165 mg. per 100 ml., and the urea-clearance was 110% normal.

Case 9.—A market gardener, aged 49, had been off work for nine months with generalised œdema of insidious onset. On admission in July, 1954, he had considerable œdema of the legs and sacrum, a blood-pressure of 148/90 mm. Hg, and gross proteinuria. Detailed investigations (see table) confirmed the diagnosis of the nephrotic syndrome, for which no cause was found. On treatment with exchange resins he lost 10 lb. in weight in two weeks and his œdema practically disappeared. His progress as an outpatient on a high-protein low-salt diet and exchange resins during the next eighteen months is shown in the tabie.

The œdema has been well controlled, but his blood-pressure has risen to 190/100 mm. Hg, and a fluffy exudate has appeared in the right fundus. His urine still contains protein 0·8 g. per 100 ml., the blood-urea is 48 mg. per 100 ml., urea-clearance 55%, serum-albumin 2·5 g. per 100 ml., and serum-cholesterol 426 mg. per 100 ml. Electrophoretic studies now show a low serum-albumin and raised α_2-globulin and γ-globulin. No lupus-erythematosus cells have been found. When last seen he was working six or seven hours a day on his farm.

Discussion

Cation-exchange therapy combined with a high-protein low-sodium diet provides an effective method of controlling the œdema in most adults with the nephrotic syndrome. Provided that certain precautions are

observed, it can safely be used for many months. In some patients, especially those in whom the syndrome is well marked, treatment may be accompanied by a rapid decrease of proteinuria, a rise in the plasma-albumin concentration, and return of the serum-cholesterol to normal. This has happened in 6 of our 13 patients, and 3 of these now have no protein in their urine. We do not, however, claim that this improvement has been a direct result of treatment; relapse may yet take place.

We are at present reviewing about 200 cases of the nephrotic syndrome of all types and at all ages seen at University College Hospital in the past twenty years, and have records of only 10 patients who have had a complete remission lasting more than three years, judged by the absence of œdema, a normal serum-albumin level, and proteinuria of 0·1 g. or less per 100 ml. 9 of these patients had Ellis type-II nephritis and they occurred among 71 patients with this type of nephritis.

Published figures for the prognosis of the nephrotic syndrome vary considerably, depending both on the definition of the syndrome and on the age-group studied.

Ellis (1942) reported only 5 recoveries in 145 cases.

Rennie (1947) saw 3 apparent complete recoveries in 29 patients.

Tappan (1935) reported 8 apparent full recoveries among 45 cases of the nephrotic syndrome in children.

Schwarz and Kohn (1935) followed 9 out of 36 children with the nephrotic syndrome to full recovery. Their criteria of full recovery were freedom from œdema, normal urine, and normal blood-pressure for at least a year. Yet Schwarz et al. (1943) reported that 4 of these children subsequently showed hypertension, occasional proteinuria, and an increased Addis count, and 4 others had an increased Addis count but no hypertension.

Treatment with cation-exchange resins may promote recovery in at least two ways: first by the reduction of œdema, and secondly by permitting treatment with a high-protein diet with its added sodium content.

The rapid control of œdema in itself appears to reduce proteinuria. Proteinuria and œdema tend to diminish simply with rest in bed, and a similar improvement in the urine of nephrotic persons sometimes follows the diuresis that may accompany an infection or the administration of cortisone. This closely associated loss of œdema and decrease in proteinuria may long precede any rise in the serum-albumin concentration. This may be a natural coincidence of two common aspects of recovery both dependent on some major factor at present unknown; or a reduction of œdema in the kidney may facilitate the tubular reabsorption of protein or decrease the escape of albumin through the glomerulus.

A high-protein diet may be an important factor in maintaining the serum-albumin level, preventing a deficiency of γ-globulin, and improving renal function. Recent studies with ^{131}I-labelled albumin (Kramer 1955) have shown that, in nephrotic children, the mean half-life of albumin in the plasma was only two days compared with twelve days in healthy children, and it was calculated that, to maintain a constant serum-albumin level, the nephrotic child with heavy proteinuria needs to synthesise albumin at five or six times the rate of the healthy child. No great increase in the rate of synthesis of serum-albumin was found by Gitlin et al. (1956). Nevertheless there is reliable evidence (Farr 1938, Blainey 1954, Squire 1955) that a high-protein diet can be efficiently utilised by nephrotic patients. In nephrosis the low serum-albumin level is associated with a severe generalised deficiency of body-protein, and we believe that prolonged high-protein feeding is indicated and that it assists recovery.

Patients with the nephrotic syndrome are particularly liable to infection and characteristically they have a very low level of γ-globulin in their plasma. Hodges (1955) has shown that the immune response to type-specific polysaccharides of pneumococcus type I is much less in the nephrotic than it is in healthy children, and the liability to infection may be related to such a failure of immune response. The restoration of the plasma-γ-globulin level to normal may restore the immune response to infection and may possibly be a factor in preventing relapse of the syndrome.

A high-protein intake in a healthy man leads to an increase of 15–30% in the glomerular filtration-rate and renal blood-flow (White and Rolf 1948, Pulman et al. 1949). Even if a smaller rise in filtration-rate were obtained in nephrotics it could still be a major factor in promoting a diuresis of sodium and water. Leutscher (1955) has emphasised the rôle of aldosterone in the nephrotic syndrome, and renal tubular factors may be more important in the production of œdema than are variations in the glomerular filtration-rate.

Even in those patients in whom exchange-resin therapy is not accompanied by remission, prolonged outpatient treatment offers many advantages. The stay in hospital, or in bed at home, is much reduced, morale improves, and, once œdema is controlled, the patient can often resume work despite continuing proteinuria. Resin therapy is thus of considerable social and economic value. We emphasise that, so long as gross proteinuria persists and the plasma-albumin concentration remains low, treatment should be continued even in the absence of œdema.

The difficulties and dangers of resin therapy are few and are now well recognised. If renal function is impaired, acidosis and extrarenal uræmia may develop, and usually this treatment cannot be used in the presence of renal failure. The plasma-potassium level may fall in patients under treatment, even though the resin is given partially in the potassium phase. Treatment should therefore be intermittent, the resin being given for five or six days, potassium citrate 3 g. being given on the intervening days. With this precaution hypokalæmia seldom develops. Occasionally a low-sodium syndrome may be produced, but this is seen more commonly in cardiac patients who are on a low-sodium diet and receiving mercurial or other diuretics at the same time as exchange resins. It should not happen in nephrotics on a high-protein diet. Finally, the serum-calcium level may fall with prolonged treatment. This has been reported, especially in children (Macaulay and Watson 1954). In the youngest of our patients a serum-calcium of 5·8 mg. per 100 ml. was recorded after ten months' treatment. This hypocalcæmia was, of course, partly due to the low serum-albumin level. Difficulties have been few in our patients; and, once treatment has been established, monthly clinical observation and measurement of the plasma electrolytes and blood-urea provide adequate control of treatment.

We have been unable to find a comparable series of adult nephrotics treated with cortisone or with corticotrophin, but such therapy has produced remissions in children and is widely regarded as the most effective treatment now available. It is clear that, at least in adults, treatment with cation-exchange resins may also be accompanied by remission, and claims for any specific value of cortisone therapy will have to be critically assessed.

Summary

13 patients with the nephrotic syndrome were treated with cation-exchange resins and a high-protein low-salt diet for from six weeks to twenty months.

All the patients lost their œdema.

In 6 patients the serum-albumin and serum-cholesterol levels and the electrophoretic pattern of the serum returned to normal, and proteinuria disappeared or became less than 0·1 g. per 100 ml. These patients have now been off resins and on a normal diet for from nine months to four years without a recurrence.

In the 7 other patients, although the œdema disappeared, the serum-albumin is still below 4·0 g. per

100 ml., and the proteinuria is more than 0·1 g. per 100 ml.

Details of the diet, resin therapy, and method of control are given. It was possible to treat patients for many months as outpatients while they continued at work.

Treatment should not be stopped when the œdema has gone but should extend over many months until the serum-albumin level has risen to 4 g. per 100 ml. and proteinuria is minimal.

Our very sincere thanks are due to Prof. M. Maizels and Dr. F. V. Flynn for help with the numerous pathological investigations and to Mr. V. K. Asta and Mr. A. Bligh for the charts and photographs.

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BYSSINOSIS IN COTTON AND OTHER TEXTILE WORKERS*

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(*concluded from p. 265*)

Byssinosis in Other Cotton Industries

Byssinosis is not confined to the cotton mills of Lancashire. There have been many accounts from Europe of chronic respiratory disease in cotton workers since Patissier (1822), in France, reported that they suffered from pulmonary irritation due to dust. Caminita et al. (1947) show that the term byssinosis is used indiscriminately for pulmonary affections in cotton operatives; they cite only Mareska and Heyman (1845), in Belgium, Knoeri (1884), in France, and Koelsch (1933), in Germany as finding the characteristic Monday symptoms, although in Switzerland and in Denmark carders and balebreakers had been found to suffer unduly from asthma, bronchitis, and emphysema (Schuler 1872, Trier 1938).

On the strength of the Monday symptoms byssinosis has been described recently in cotton workers in Holland, France, and Italy (Verhaeghe 1950, Vismans 1952, Vigliani 1953, L. Muller and P. G. op de Coul, personal communication, Werner 1955).

In the United States of America about 1500 cotton operatives in one large plant were fully investigated, and the 400 or more card-room workers at risk were not found to be affected by the dust (Britten et al. 1933, Bloomfield and Dreessen 1933). Other less extensive field studies in the United States of America have also given negative results (Smith 1942, Ritter and Nussbaum 1945). On the other hand, 2 American card-room workers in Massachusetts (Bolen 1943) and 1 in South Carolina (R. Murray, personal communication) had typical histories of byssinosis. Emerson (1950), from the Peter Bent Brigham Hospital in Boston, describes a card grinder with byssinosis and reports that the patient's local doctor in the mill town had 6 other patients similarly affected. The United States Department of Labor, Labor Standards Division (1945) has suggested that byssinosis is not a problem in American mills because of efficient dust control and because workers often change their jobs and therefore do not have long exposures. I can find no definite description of byssinosis in the cotton workers of Japan and India, which (after the United States of America) are the largest producers of cotton yarns (Cotton Board 1955).

With different epidemiological and diagnostic methods it is impossible to make any accurate comparison of the prevalence of disease in the cotton industries of different countries; but Werner (1955), in France, has reported prevalences among card-room workers and spinners somewhat similar to those we found in the coarse-spinning mills of Lancashire; and preliminary results indicate that in Holland there is less disease than in Lancashire (L. Muller and P. G. op de Coul, personal communication).

Byssinosis from Other Vegetable Dusts

Ramazzini (1713), in Italy, mentioned the continual coughs and asthma of combers who prepared hemp and flax for spinning. Patissier (1822), in France, and Thackrah (1832), in England, noted similar complaints in flax workers and concluded that flax and hemp dusts were more injurious than cotton dust, but there are no morbidity-rates or mortality-rates for flax and hemp workers to support these opinions. Greenhow (1861) examined about 100 English flax workers and found that most of them were suffering from bronchial irritation due to their work. He mentioned the characteristic history of operatives being more affected by the dust at the beginning of the week.

During the middle of the 19th century the cotton famine in England brought exceptional prosperity to the Irish linen industry. Flax spinning ceased to be an occupation mainly for countrymen in their homes and became concentrated in mills in Belfast (Armstrong 1951). It was thought at first that the dust in flax mills was disagreeable but not dangerous (Moore 1868) but Purdon (1873, 1875, 1877) described flax operatives as suffering severely from respiratory disease and dying prematurely. Later in Belgium (Glibert 1902) and in France (Bergeron 1930) the inhalation of flax dust was said to cause asthma and bronchitis.

When flax spinning was revived in England during the late war, some workers in the scutching factories complained of chest tightness which was worse at the beginning of the week. They may have had early symptoms of byssinosis; but, although concentrations of airborne dust were apparently high, the time spent in the factories was short and the total exposure to dust insufficient to cause serious disease (Goodall and Hardwick 1951). J. Nelson (personal communication) diagnosed byssinosis on the history of Monday symptoms in 11 of 19 Belfast linen workers selected for investigation because they had chronic respiratory disease; 3 of them were seriously disabled with dyspnœa.

A. T. Doig (personal communication), in Scotland, and Werner (1955), in France, have also found byssinosis in flax and hemp workers. Werner showed that it was more prevalent among those handling mixtures of hemp and flax than among those handling only flax (table VII).

*Milroy lectures delivered before the Royal College of Physicians of London on Feb. 7 and 9, 1956.

TABLE VII—PREVALENCE OF BYSSINOSIS IN WORKERS WITH FLAX AND MIXTURES OF FLAX AND HEMP IN FRANCE (WERNER 1955)

—	Flax	Flax and hemp
Total exposed	325	427
Number affected	42	223
Proportion affected	13%	52%

J. Nelson (personal communication), in a detailed study of 114 women and 27 men at risk in a rope works using mostly hemp, found that 32% of the women and 26% of the men had symptoms of byssinosis. The average exposure for the women was only ten years, and 5 of them were moderately disabled with dyspnœa. Jiménez Díaz and Lahoz (1944), in Spain, have described a disease of hemp workers called "cannabosis," which appears to be the same as byssinosis. They report that, in one region in Spain, the mean life spans of agricultural and hemp workers were respectively 67·6 and 39·6 years.

Arlidge (1892) and Wilson (1902) reported that dust from jute also caused chronic respiratory disease. I have not been able to find a reliable description of byssinosis among jute workers, and recently I interviewed 20 jute workers in a Dundee mill. Each had spent from fifteen to forty years in the departments of a jute mill where there is fine dust. 2 had mild chronic bronchitis, but not 1 of the 20 gave a history of Monday symptoms.¶

The cotton workers of England are apparently the only occupational group for which there is a byssinosis compensation scheme; but clearly a disease similar to cotton workers' byssinosis is also endemic among those who prepare hemp and flax for spinning.

Pathology

The few studies made of the pathology of byssinosis report findings such as chronic bronchitis and emphysema, which are not specific in type (Greenhow 1869, Landis 1925, Schilling 1925, Dunn and Sheehan 1932, Ruszczewski et al. 1954); but an interesting personal communication comes from Prof. J. Gough, who has examined the lungs of 3 Lancashire cotton workers said to have had byssinosis:

"In byssinosis, the lungs do not show distinctive fibrosis comparable to silicosis or asbestosis but rather non-specific chronic bronchitis and emphysema. Nevertheless the lungs contain an excess of dust, although not in very great amount. The dust is black and appears to be mainly carbonaceous. As with other dusts in the lung, it collects into foci but it is only slightly fibrogenic. Reticulin and a few strands of collagen form among the dust cells. There is, however, an interesting reaction to the dust, or some component in it, leading to the formation of 'bodies' comparable to asbestosis bodies but different in shape. There is a central nidus of black dust around which is a slightly yellowish homogeneous zone giving a double contour. These dust bodies vary in size up to about 10 μ in diameter. The material around the dust in some instances stains like iron. The material is presumably precipitated around the dust in the same way as the covering develops around asbestos and other fibres. The difference, however, is that in byssinosis the resultant bodies are round or oval and not elongated like characteristic asbestos bodies.

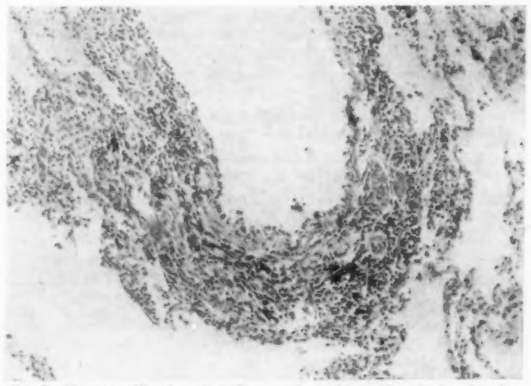

Fig. 8—Non-specific chronic inflammation of bronchus in byssinosis.

"The general pathological changes can be seen in large lung sections which show the dust and the emphysema. The emphysema is generalised but may be somewhat more pronounced in relation to the deposits of dust (fig. 7). Histologically the bronchi show signs of chronic inflammation (fig. 8), some with metaplasia of the epithelium (fig. 9). The histological sections are from the lung of a man, aged 57, whose death was accepted as being due to byssinosis. He had been in a card room for more than thirty years but had been off work for only two years."

Dr. R. C. Woodcock (personal communication), in his preliminary observations of the lungs of Lancashire cotton workers, found no distinguishing features microscopically, but there were minor degrees of emphysema, and the bullæ were relatively small in the lungs of some men reported to have had severe disability. Fig. 10 is a section showing minor degrees of emphysema in the lung of a man who died at the age of 66 having spent forty-one years in card and blow rooms. He had had typical Monday symptoms with severe dyspnœa and cough and had received a 100% disability pension for byssinosis. Radiographically he had had no abnormality in his chest, and his cardiovascular system had apparently been healthy.

The significance of the bodies described by Professor Gough and the relatively minor degrees of emphysema seen in some specimens will be investigated further. Perhaps chronic bronchitis and emphysema are not the only changes causing disability. Prausnitz (1936), in his

¶ Grace Smith (personal communication) recently examined 26 jute workers in another mill, some of whom had spent many years exposed to fine dust. None gave a history of byssinosis.

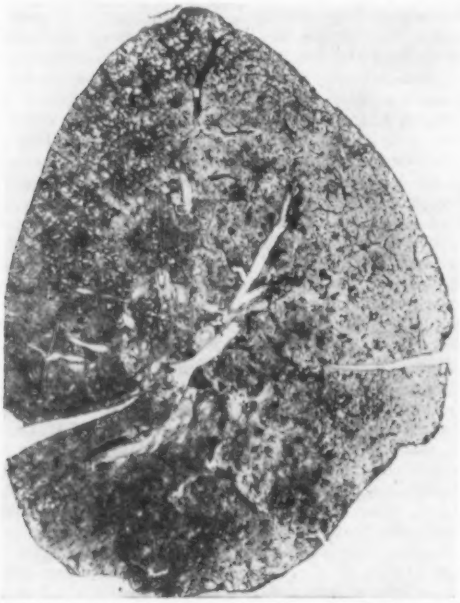

Fig. 7—Whole section from lung of cotton worker with byssinosis, showing generalised emphysema.

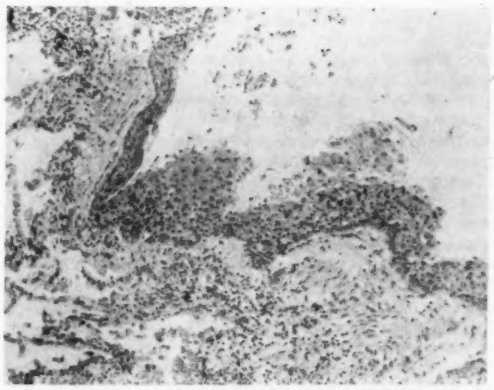

Fig. 9—Non-specific metaplasia of epithelium in byssinosis.

experiments on animals, found that prolonged inhalation of cotton dust caused thickening of the interalveolar walls apparently from œdema as well as from infiltration by leucocytes and dust cells. Similar changes have not been seen in man.

Clinical History and Pathogenesis

The characteristic clinical history of byssinosis is that the worker, after some years in the industry, notices a tightness in his chest on Monday afternoon. He may be short of breath and find that it takes him longer to walk home on Monday evening. His symptoms disappear after he has been at home for an hour or so. On Tuesdays and other working days he feels well and has no symptoms. He may continue in this way for years without getting any worse, and when he leaves the industry his symptoms cease. Some workers get progressively worse and complain of chest tightness and breathlessness on Tuesdays, then on Wednesdays, and so on, until they are affected on every working day. When they are on holiday, or if they leave the industry, the characteristic symptoms disappear, but they are left with permanent effort intolerance. At this stage they may have an aggravating cough with or without sputum. Prausnitz (1936) thought that the Monday symptoms, which make byssinosis such a unique respiratory disease were the result not of a specific reaction but of a physical or possibly psychical shock from resuming dusty work after one and a half days in a clean atmosphere. He suggested that at the weekends the worker would be out of doors a good deal and would breathe deeply, and continuing to do this on Mondays he would rapidly draw large amounts of irritating material into the lungs. On other days he would gradually become accustomed to the dusty air and breathe shallowly. If this were a correct explanation, Monday symptoms would be expected as a result of prolonged exposure to any irritating dust or fume at work, whereas they are a feature only of exposure to certain vegetable dusts.

Fig. 10—Whole section of lung in byssinosis showing only minor degrees of emphysema.

Schilling et al. (1955b) found a highly significant reduction in the M.V.V. of workers with byssinosis on Mondays in the afternoons compared with Thursdays (fig. 11). J. Nelson (personal communication) has since obtained similar results in women rope-workers.

I will recount the history of a young blow-room worker because it seems to illuminate the nature of byssinosis :

A man, aged 35, had been discharged fit from the Army and started work in the blow room at the age of 26, and he played rugby-league football. He noticed no ill effects for two seasons, but during the third he was unusually breathless when training on Tuesdays and Thursdays. Because he was so short-winded he gave up football in the middle of that season. Two years later he began to notice that his chest was tight on Mondays when he was at work. He was a non-smoker and had never had any chest illness. He had an outstandingly good physique, and clinically no abnormalities were found.

C. B. McKerrow and M. McDermott (personal communication) found that workers with mild byssinosis have a progressive reduction in their ventilatory capacities during work on Mondays. On other working days there are similar but less severe reductions.

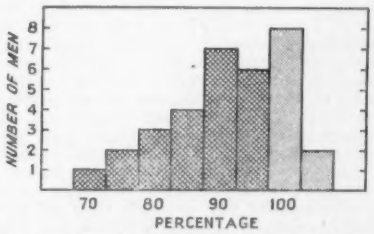

Fig. 11—Percentage change in maximal voluntary ventilation on Mondays compared with Thursdays of 33 men with byssinosis.

These results suggest that something in the dust causes either spasm or œdema of the bronchioles. This spasm or œdema tends to lessen as the week advances and reappears on the following Monday. For some time there may be no symptoms at ordinary levels of exercise but, if the condition gets worse, symptoms appear first on Mondays, and then on Mondays and other working days. This explains the significant reduction of the M.V.V. on days other than Mondays in men with early symptoms of byssinosis (fig. 5).

The " asthma " of byssinosis has usually been regarded as a hypersensitive or allergic reaction (Home Office 1932, Prausnitz 1936, Furness and Maitland 1952, Werner 1955). But this concept needs careful scrutiny in the light of what is known about the types of response of human tissues in hypersensitivity. These have been well reviewed by Squire (1952). In the usual asthma-urticaria-hay-fever type of reaction an " immediate " response—i.e., within 10–30 minutes—results from exposure to specific antigens, usually proteins. Thus a horse-sensitive person develops asthma quite soon after breathing air which contains horse dandruff, and an urticarial weal follows inoculation of dandruff extracts into his skin within 10 minutes. In the plasma of these patients a form of specific antibody can be demonstrated by special tests (cf. Prausnitz-Kustner reaction below). In the tuberculin-trichophytin type of hypersensitivity there is a greater delay between exposure and reaction. Tuberculin skin tests, for example, even when strongly positive, are only just detectable from six to eight hours after the inoculation. Antibodies responsible for this

type of reaction are not readily detectable in plasma but appear to be carried on the blood lymphocytes. The essential nature of these two types of reaction appears to be different. The rapidly developing type is mainly œdema, probably provoked by local liberation of histamine-like substances; the delayed reaction is accompanied by a cellular infiltration with various types of round cells. Too little is known to discuss the possibility that byssinosis may be an example of the delayed type of reaction which is not usually thought to be associated with dyspnœa in any form. But there are several reasons for not regarding the asthma of byssinosis as an asthma-urticaria reaction or true asthma:

(1) The symptoms in byssinosis have a delayed onset and improve as the week goes on. So far as is known, no such syndrome has ever been described in true asthma, even when it is associated with an occupation—e.g., printer's asthma caused by gum acacia used in a spray to prevent smearing (Bohner et al. 1941).

(2) In byssinosis a large proportion of those exposed may be affected, whereas in true asthma the proportion affected is usually small.

(3) Skin tests in byssinosis have given conflicting results. Prausnitz (1936) produced an immediate type of reaction in all men with byssinosis whom he tested with cotton extracts. He demonstrated passive transfer of sensitivity by the Prausnitz-Kustner technique and concluded that this was hypersensitivity specific to the disease. Cayton et al. (1952a), using a variety of extracts of cotton dust, found a lack of correlation between a rapid allergic type of skin reaction produced by these extracts and symptoms of byssinosis. The same incidence of reactors was found in adults who had never been exposed to cotton dust, in cotton operatives not exposed to dust, in those exposed to cotton dust but who had no symptoms of byssinosis, and in those with early and with advanced symptoms of byssinosis. Cayton et al. (1952b) found a striking similarity in the incidence of reactors to extracts of house dust and cotton dust in each of these groups and concluded that the skin tests did not reveal a specific hypersensitivity peculiar to byssinosis.

Bramwell and Ellis (1932) and Brown (1932) also produced an allergic type of skin reaction with injected cotton extracts; but their results are difficult to interpret because their extracts contained histamine (Maitland et al. 1932) which has been found in cotton dust by others (Macdonald and Maitland 1934, Prausnitz 1936, Ministry of Labour 1952). Haworth and Macdonald (1937), who found higher but more variable levels of histamine in the blood of card-room workers than in controls, suggested that card-room asthma "might be due to the combined effects of the histamine and an allergen." Jiménez Díaz and Lahoz (1944) examined hemp dust and found no histamine. Since byssinosis is known to occur in hemp workers, histamine may well be a "red herring," adding further confusion to a complex issue.

Both Prausnitz (1936) and Cayton et al. (1952a), in their skin tests with cotton extracts, noted a delayed type of skin reaction which they thought to be due to non-specific toxic substances. Prausnitz suggested that these might be irritating soluble proteins in the cotton dust, and that they produced thickening of the alveolar walls which interfered with oxygen diffusion and caused dyspnœa. He concluded that this reaction, and not allergy, was the major one in byssinosis.

A possible explanation of the pathogenesis is that there is, in the dust emitted during the preparation of vegetable fibres, a substance which exerts a specific action on the pulmonary bronchioles, giving rise to the Monday symptoms which, for some unexplained reason, get less severe each day during the working week. As in other industrial pulmonary diseases, superimposed infections may play an important part in the progress of byssinosis. Cotton workers in Lancashire do not suffer unduly from pulmonary tuberculosis, which is seldom found as a complication in byssinosis; but they are exposed unduly to the risk of contracting chronic bronchitis because they live in Lancashire; and byssinosis may make them more susceptible to infection. Possibly the few men who have immediate and severe asthmatic symptoms on exposure to dust have a true asthma of the asthma-urticaria type.

A causal agent for byssinosis was first suggested by Arlidge (1892), who blamed an inherent quality of the vegetable fibres; but these are made of cellulose, which in other forms—e.g., wood dust and rayon—is not known to cause byssinosis. Collis (1909) blamed the emery dust produced by grinding the carding teeth. Middleton (1926) suggested mould fungi acting alone or with other constituents. The soluble proteins from leaf and seed coat have also been incriminated (Prausnitz 1936).

The high concentrations of bacteria in card rooms of cotton mills and the high viable counts of bacteria and fungi in cotton-waste have recently been considered as possible causes but not as agents of infection in the ordinary sense (Furness and Maitland 1952, Drummond and Hamlin 1952). Moulds and bacteria have also been suggested as the cause of the disease in flax workers (Thiry 1941).

Some workers suffer from fever or chills and nausea and vomiting when they first work in flax, hemp, or cotton mills or if they return to this work after a prolonged absence. This complaint has been called mill fever, cotton fever, or hemp fever and usually disappears after a few days (Arlidge 1892, Oliver 1908). In England mill fever was described as an early stage of byssinosis by Gill (1947) and in the *British Medical Journal* (1948), and the terms "byssinosis" and "mill fever" are sometimes used synonymously (United States Department of Labor 1945, Bogan 1946, McCarthy and Akenhead 1946, Perry 1952, Hollander 1953).

Neal et al. (1942), in the United States of America, who investigated an outbreak of acute illness very like mill fever in workers making mattresses from low-grade cotton, isolated large numbers of a gram-negative bacillus, *Aerobacter cloacæ*, from the cotton and showed that the endotoxin of this organism was probably the cause of the illness (Schneiter et al. 1942). Caminita et al. (1943) isolated a similar organism from the dust of cotton and hemp mills and thought that it was responsible for cotton fever and hemp fever and that repeated exposures might be a contributory factor in byssinosis.

Mill fever is uncommon in workers exposed to vegetable dusts, especially cotton. Werner (1955) recorded it in only 26 of 414 workers with byssinosis. In our recent studies of cotton workers we asked questions about the occurrence of chills, fever, nausea, and vomiting during the first few days of employment in the mill. Few of the workers said they had had these complaints, and there was no significant association between a history of mill fever and the occurrence of byssinosis (table VIII).

TABLE VIII—ASSOCIATION BETWEEN MILL FEVER AND BYSSINOSIS

	No byssinosis symptoms		Byssinosis symptoms	
	Mill fever	Total	Mill fever	Total
Men ..	9 (9%)	95	3 (7%)	40
Women ..	15 (5%)	299	11 (12%)	94

A. cloacæ, a normal constituent of the soil, contaminates cotton in cold and wet seasons, and is probably the causal agent of mill fever, but there is no evidence that it plays any part in the ætiology of byssinosis. This idea may have arisen because Prausnitz unfortunately called byssinosis "Monday fever," which has been confused with mill fever.

Present and Future Research

The determination of permissible levels of dust concentrations in the atmosphere has been given priority because, until this has been done, it will be impossible to measure the efficacy of methods of controlling dust. The principle of this research, which is to relate prevalence of disease to exposure to airborne dust, has been

described by Roach (1953) in a study of coalminers' pneumoconiosis and is now recognised as a method of determining threshold limits of dustiness in various industries (Hatch 1955). The exposure of each man to dust may be calculated from representative samples of dust and from the length of time spent in various occupations. It may be expressed in mg. or particle years (the product of the duration of the exposure and the concentration of respirable dust in mg. or particles per c.m.). By relating exposure to dust to the prevalence of byssinosis in mills where conditions have been fairly constant, an exposure response curve may be constructed. From such curves the proportion of men who will develop byssinosis at certain exposures may be estimated and, fiducial limits being taken into account, permissible conditions can be defined.

To discover the causal agent it will be necessary to fractionate the airborne dust and to test the effect of each fraction on the respiratory tract. Experiments on animals only will not be very helpful, because a specific tissue reaction in byssinosis has not yet been demonstrated. But in man the timed vital capacity gives an objective measurement of the Monday symptoms. It should be possible to obtain pure samples of bacteria and of moulds by culture. By rendering the samples airborne in sufficient concentrations to simulate working conditions, they could be tested by measuring the reactions of susceptible people exposed to them. If, after further surveys, it is established that byssinosis does not occur in the jute industry, comparison of the constituents of airborne dust in cotton, hemp, flax, and jute mills may give valuable clues to the nature of the causal agent.

Why the disease progresses in some workers cannot be satisfactorily explained. The suggestion that progression may be due to superimposed infections or to the development of an asthma-urticaria type of reaction needs further investigation.

Prevention

Cotton can be cleaned very effectively by the cotton growers before it is baled, but cleaning is expensive, and it would take a long time to install the plant in the cotton-growing countries (Ministry of Labour and National Service 1952). If the causal agent were known, it would be much easier to encourage the growers to remove it.

In the past it was thought that the problem had been solved by reducing the dust from stripping the carding engines. Unhappily this has proved to be incorrect. Several additional methods of dust control are now used and have been described by the Joint Advisory Committee of the Cotton Industry (Ministry of Labour and National Service 1946, 1952). The Shirley Institute, the Research Association of the British Cotton Industry, has developed more efficient methods of opening and cleaning the bales of cotton. The oiling of cotton before it is blown and carded is another procedure which suppresses the dust appreciably (Ministry of Labour and National Service 1952). Its popularity has waned because it is difficult to maintain an oiling system without spoiling the quality of the yarn. Several mills have installed air-conditioning and air-washing plants at great expense. Although dust concentrations are lowered in this way, it is unlikely that they can be reduced to safe levels. Compared with the dust in coalmines, cotton dust produces a high prevalence of industrial pulmonary disease at relatively low concentrations. In the card rooms of one coarse-spinning mill, in which nearly 40% of the population had symptoms of byssinosis, the concentrations of respirable dust—i.e., particles 1–5 μ in diameter—were about 400 particles per c.cm. The permissible concentration of respirable dust in coalmines is 850 particles per c.cm. (National Coal Board 1948).

The Shirley Institute has studied the points on the carding engine from which dust is liberated, and applied a system of exhaust ventilation to the most important sources of the dust. The results are very promising and are being tested in a mill spinning coarse counts. The card room has been divided into two parts: one is unchanged, and in the other the carding engines have been fitted with this new device. Since the same type of cotton is passing through both parts, it will be possible to measure the efficiency of this appliance and to find out if it can reduce respirable dust to the permissible levels determined from the investigations being made in other mills.

The dust problem in blow rooms should not be overlooked. There are relatively few workers at risk, but the prevalence in blow rooms is as high as in card rooms (Schilling et al. 1955b).

The control of byssinosis in Lancashire will depend on the supply and maintenance of a satisfactory method of controlling dust. It will be important to find out which mills are most in need of dust control by environmental surveys and by measuring airborne dust, which will also be needed to ensure that dust control is satisfactorily maintained. Our researches indicate that priority should be given to mills spinning coarse and medium counts.

Periodical Medical Examinations

If a satisfactory method of dust control is found, it should be possible to introduce it into all mills without much delay. If there is to be any delay, there is a need for some other immediate measure by which men and women can be removed from a dangerous environment before byssinosis has caused serious disability.

The Industrial Injuries Advisory Council recently recommended that the disablement pension for byssinosis should no longer be subject to any special limitation as regards the degree of disablement, and that the condition relating to length of employment in a prescribed occupation should be reduced from twenty to ten years (Ministry of Pensions and National Insurance 1956). These changes will make it easier for the disabled to leave their dusty occupations, but it will still be left to their own initiative to apply for a pension. In my experience Lancashire cotton workers tend to put up with their disabilities and to remain at work. A system of periodical medical examinations would help to overcome this difficulty by diagnosis and advice and could also indicate the mills which had high attack-rates and which therefore needed to pay more attention to dust control.

Combined with routine dust counts such examination would enable the permissible levels of dustiness to be reviewed from time to time. People with less disabling stages of byssinosis could also be encouraged to continue working in mills which had safe atmospheric concentrations of dust.

Our knowledge of the natural history of byssinosis is too meagre to indicate with any reliability at what stage a worker with byssinosis should be advised to leave his work. Periodical medical examinations could be used to determine the course of byssinosis in those who have remained exposed and in those who have been removed from further exposure. In time it would give valuable information about the appropriate stage for removal. At present those who have mild symptoms on Mondays are advised to remain at work, and the relatively few whose symptoms progress, or who have some permanent effort intolerance, are advised to change their work.

In Lancashire a voluntary system of periodical medical examinations could be undertaken by the appointed factory doctors. In our recent field surveys less than 1% of card-room and blow-room workers refused to be examined, and there is every reason to believe that the scheme would be supported. Yearly interviews are suggested. The workers would be questioned particularly about their breathing. Clinical and radiological exami-

nations of the chest need only be done when the patient's history indicated that they were necessary.

Initial medical examinations are already required for young persons under the age of 18 when they are first employed in a cotton mill. If there is to be a long delay in controlling dust, such a scheme should be extended to cover the older workers, to ensure that those who already have any chronic respiratory disease can, where necessary, be excluded from working in the dusty processes.

There is no satisfactory treatment for byssinosis except the removal of the patient from the dusty atmosphere. Medicine and inhalants containing antispasmodics give only temporary relief. The most important responsibility of the patient's doctor is to distinguish byssinosis from non-occupational bronchitis and to give the patient appropriate advice about his work. Some workers with mild byssinosis appear to get much worse after a superimposed infection—e.g., pneumonia and acute bronchitis. Any card-room or blow-room worker who has had an acute respiratory infection should be kept under medical supervision for a few months after returning to work.

Similar preventive measures can be adopted in the other textile industries. Their need and the method of applying them can only be determined by epidemiological and environmental surveys.

Conclusion

I have tried to describe a disease which at present has to be diagnosed solely on the patient's history. It is not surprising that it has been overlooked in this age of medicine in which doctors have so little time for history taking and hesitate to make a diagnosis without the aid of the laboratory and the radiologist. Its investigation in the Lancashire cotton industry has presented special problems of methodology, such as measuring the reliability of the history and surveying defined populations in different types of mills to determine the true prevalence. Compensation figures and mortality and morbidity statistics, so often of value in epidemiology, have all been misleading.

The clinical survey has offered excellent opportunities for combined studies with industrial hygienists, physiologists, and bacteriologists to determine safe levels of dust and to discover the nature and cause of this unique syndrome in respiratory disease.

The ætiology of byssinosis remains obscure, and little is known of its prevalence in other textile industries. But in Lancashire, with a new awareness of the disease and more effective methods of dust control, the cotton workers should soon be rid of it after suffering for more than a century.

The research described in this paper has been undertaken by a team of several people from the Department of Occupational health in the University of Manchester and from the Pneumoconiosis Research Unit. All have contributed to the preparation of this paper. I wish to thank them all, particularly Prof. R. E. Lane, Dr. J. C. Gilson, Miss I. Dingwall-Fordyce, Dr. I. T. T. Higgins, Dr. J. P. W. Hughes, and Mr. S. A. Roach. I am also indebted to several colleagues and friends outside these departments: Dr. Douglas Hill, director of the Shirley Institute, for constant encouragement and advice; Prof. J. Gough and Dr. R. C. Woodcock for communications on the pathology; Prof. J. R. Squire, Prof. H. B. Maitland, and Dr. P. G. Tuffnell for help in preparing the section on pathogenesis; Dr. J. M. Davidson, of the Ministry of Pensions and National Insurance, and Mr. J. Morton, of the Federation of Master Cotton Spinners, for supplying compensation figures; Mr. Bryan Harvey, one of H.M. inspectors of factories, for his interest and help in many ways; and to many others for personal communications, for helpful criticisms, and for translating papers. I am also grateful to the Medical Research Council for a grant to study byssinosis. The field work has been made possible by the enthusiastic support of the Federation of Master Cotton Spinners, the Card and Blowing Room Operatives and Ring Spinners' Association, mill managers, and many cotton workers.

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THE LOCALISATION OF CEREBROSPINAL-FLUID FISTULÆ

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WE describe here a new technique for identifying and localising cerebrospinal-fluid (C.S.F.) leaks into the nasopharynx.

By far the commonest cause of C.S.F. rhinorrhœa is head injury. Other causes are intracranial, intranasal, and intra-aural operations, and bony and dural erosion by infection, neoplasm, or hydrocephalus. Because of the frequent complication of meningitis or of cerebral abscess in cases of long-continued C.S.F. leakage, opinion is unanimous about the advisability of operative repair of a persistent or recurrent fistula. The advent of chemotherapeutic and antibiotic drugs has made this safe.

Identification of Rhinorrhœa

If a clear or initially bloodstained watery fluid flows from the nose soon after a head injury and there is radiological evidence of a fracture involving either the frontal sinus or the base of the skull, one can be fairly certain that this fluid is C.S.F. Occasionally a watery rhinorrhœa starts either a little or a long time after injury or operation; is this a C.S.F. rhinorrhœa, or is it a so-called "allergic vasomotor rhinorrhœa"?

In cases of "vasomotor rhinorrhœa" there is probably a previous history of hay-fever or of bronchial asthma, and the attacks are associated with constitutional disturbance, congestion of the nose, nasal irritation, sneezing, and lacrimation. The rhinorrhœa is not influenced by the posture of the head, as it often is with C.S.F. leaks, and eosinophilia may be found in the blood and in the rhinorrhœa fluid. But cases may not be clear-cut, and mistakes may be made in diagnosis: Lewin (1954) describes a case of rhinorrhœa which was submitted to exploratory craniotomy and, in retrospect, was thought to be a "vasomotor rhinitis."

It is usually stated in textbooks that the only nasal discharge to contain a reducing substance is C.S.F. Normal mucus contains no reducing substance. Lacrimal secretions, however, contain as much sugar as does C.S.F. (Ridley 1930). Since lacrimal secretions pass normally into the nose via the nasolacrimal ducts, it is obvious that even normal nasal fluids must contain traces of sugar. Furthermore, when the nasal mucosa has been damaged by prolonged infection or irritation, some exudate from the plasma may be added to the nasal secretions, which may then contain additional traces of sugar. The mucous glands of the nasal mucosa are very abundant and can secrete very large quantities of clear normal mucus. Hypersecretion takes place in response to emotional stimuli, exposure to cold, and as part of a defence mechanism if some irritant is inhaled. To this would be added increased lacrimal secretion. It therefore follows that the presence of traces of reducing substance in nasal secretions is not alone proof of the presence of C.S.F.

Dyes—e.g., indigo-carmine—injected into the lumbar or the cisternal C.S.F. have been successfully used to stain the nasal discharge in C.S.F. rhinorrhœa (Fox 1933, Lewin 1954). Where this test has been useful the rhinorrhœa has been fairly copious. While we were using a radioactive isotope in research on hydrocephalus, it occurred to us that such a substance might prove valuable for detecting a C.S.F. rhinorrhœa, and Lewin also made a similar suggestion.

Localisation of Fistula

This is sometimes easy but may be very difficult indeed and has so far depended almost entirely on the demonstration of a bone defect by radiology. Where neither fracture nor erosion can be identified, the persistent presence of an opaque paranasal sinus may suggest that it is the pathway of the leaking C.S.F. Occasionally air-encephalography provides help, by indicating an abnormal lake of fluid or a ventricular diverticulum.

Lewin (1954) comments on "the difficulty in demonstrating basal fractures of the skull."

The opinion of Adson and Uihlein (1949) is that "Roentgenologic examination of the skull offers some aid in the diagnosis in cases of recent fracture, but rarely is such examination of much assistance in the localisation of a C.S.F. fistula involving the ethmoid cells."

Dandy (1944) wrote: "Drainage of fluid from one nostril predominantly is fair evidence that the fistula is on the corresponding side of the anterior fossa but that is by no means dependable proof. There are times when only an exploratory operation will determine the site of the opening, and there may be bilateral fistulæ." Dandy also stated that "drainage of C.S.F. from the nose is not pathognomonic of a fistula into the frontal or ethmoid sinus, but may occur through the mastoid bone into the middle ear and the eustachian tube."

Cairns (1937) found the opening on the contralateral side, and Lewin (1954) describes two cases with unilateral rhinorrhœa, where the main dural tear and skull fracture were on the contralateral side. He also reports on 14 patients who were subjected to bilateral craniotomy because of bilateral rhinorrhœa. In 4 of these the lesion was unilateral. Lewin and Cairns (1951) state: "Radiographic demonstration of a fracture of the sphenoidal sinus may be extremely difficult, but this lesion should be suspected when, in the absence of radiological evidence of gross fracture of the posterior wall of the frontal sinus or of the roof of the ethmoid, there is profuse rhinorrhœa. Faced with the possibility that the C.S.F. is escaping through the sphenoid sinus region, the surgeon must be prepared to make a full bilateral exposure and, if need be, to divide the olfactory tracts which are functioning normally."

The ability to detect within the nasopharynx the point of entry of C.S.F. would be of great help, and hitherto, though careful rhinological inspection may reveal the presence of an abnormal fluid, it has been impossible to state whereabouts it originates. We believe that the test described here provides a simple method of stating with confidence on which side and at what point the C.S.F. is leaking.

Technique

The test comprises the injection of radioactive sodium (^{24}Na) into the cisterna magna and its subsequent identification in one or more of a series of cotton-wool pledgets ("patties") placed in contact with the undersurface of the base of the skull and the openings of the frontal sinuses and eustachian tubes.

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^{24}Na is used for the following reasons :

(1) Sodium is a normal constituent of C.S.F. and will therefore not upset the central nervous system.

(2) The physical half-life (15·4 hours) combined with the relatively rapid turnover of sodium in the body means that the patient receives insignificant amounts of radiation.

(3) The penetrating gamma radiation of ^{24}Na makes it easy to count.

The dose used is 200 μC in 1–2 ml. of isotonic solution of sodium chloride.

The cisternal route of injection is used in preference to the lumbar because by the time the radioactive sodium in the lumbar C.S.F. has travelled up to the basal cisterns (from which it is leaking into the nasopharynx) it is greatly diluted. Furthermore it has lost a very considerable amount of radioactivity into the cord in its passage (Crow 1955). Therefore, to get a concentration of radioactivity in the C.S.F. of the basal cisterns from a lumbar injection, comparable with the concentration following a cisternal injection, a much greater amount of radioactive sodium must be injected. This is undesirable.

We prepare 16 patties (7 each side and 2 spares). Each is made of fine long-thread cotton-wool, the loose threads of which are turned in and folded over to form a small pad of area 1 sq. cm. and 2 mm. thick. Sewn firmly to each pattie is a black waxed thread 8 inches long. To identify each pattie when withdrawn from the nose after the completion of the test an hour later, we knot the threads at centimetre intervals. Starting with no knots, we continue from one to seven, for each of the two sets of seven, plus one spare.

The success of this test depends on accuracy in the anatomical placing of the cotton-wool patties. Therefore everything possible should be done to get the patient to coöperate by explaining to him what is to be done, and why.

Local analgesia is necessary, and we have used cocaine 10%, which is a most efficient vasoconstrictor, and a quick-acting local analgesic. No adrenaline should be used, because this causes subsequent reactive vasodilatation, and the hypersecretion may well cause the patties to be dislodged before the radioactive sodium has had time to reach them. Analgesia is procured by dipping fairly long flat pieces of cotton-wool in the cocaine solution, and wringing them out dry to form a flat pad about $1^1/_2$ inches long, $^1/_2$ inch wide, and 2 mm. thick. One is placed just inside the vestibule of each nostril. After a minute or two these are removed, and two other similar pieces placed further back, on each side, above the middle turbinate, and up to the roof of the nasal passages. After a minute or two these also are removed, and the patient is now ready to receive the patties.

Good illumination is necessary, and a nurse steadies the patient's head. The first pattie is placed high up, under the most anterior third of the cribriform plate. The second pattie is placed to cover the central part of the cribriform plate, and the third pattie is placed in apposition with the posterior third of the cribriform plate of the ethmoid. We call these three positions anterior, middle, and posterior ethmoid.

A record must be made at the actual time each pattie is placed in position. Thus : left side, anterior ethmoid, no knots ; middle ethmoid, one knot ; posterior ethmoid, two knots; &c., according to the number of knots on each thread attached to each pattie. It is very easy to make mistakes, and a mistake will ruin the test. We place a further pattie in the spheno-ethmoidal recess against the anterior wall of the sphenoid and another under the sphenoid sinus. A further pattie is placed in the opening of the eustachian tube. To do this a second fine thread is sewn to a pattie. This thread is sucked up a silver eustachian catheter. The catheter is placed in position with the pattie in the opening of the eustachian tube. The catheter is now gently withdrawn while air is blown down the catheter to free the pattie. There may be some risk that this pattie will be dislodged when the patient subsequently swallows, but we hope that accurate positioning, when sufficient care and skill are exercised, will reveal a leak down the eustachian tube. We have tried collecting small samples of fluid from eustachian tubes by suction applied to eustachian catheters, but this method has been abandoned. The last pattie is placed under the anterior end of the middle turbinate on each side, where the infundibulum of the frontal sinus enters the nose. This pattie should reveal any leak from the anterior fossæ into the frontal sinuses. The ends of all the threads are brought together, and their loose ends (without disturbing the patties) are gently attached to the cheeks with adhesive to be out of the way.

After the patties are in position, cisternal puncture is done under local anæsthesia, and the radioactive sodium is injected, an equivalent volume of C.S.F. having first been aspirated. The needle is withdrawn and the patient placed in the prone position, with his forehead resting on a pillow. This position is the most favourable for the escape of C.S.F. through a fistula in the base of the skull. The prone position is maintained for 40–60 minutes.

After this interval the patties are withdrawn by their threads. As each is withdrawn, its position is identified by the number of knots on its thread, which is then cut off ; and the pattie is immediately placed in the centre of the base of a counting bottle, labelled appropriately. A 10 ml. sample of blood is taken at this time to see if the radioactivity of the patties could be due to secretions from the mucosa, which have been derived from the plasma. The radioactivity in each bottle is counted by means of a ring of 8 γ-sensitive Geiger-Müller tubes set in a lead pot. After the usual corrections the radioactivity is expressed as counts a minute per pattie. The plasma count is expressed as counts a minute per ml. of plasma.

Illustrative Case-reports

Case 1.—A man, aged 27, had been involved in a motor-car accident two years previously. Immediately after the accident watery bloodstained fluid was seen flowing from his right nostril. A fracture of the base of the skull, with C.S.F. fistula, was diagnosed. Since then he has had intermittent C.S.F. rhinorrhœa, always from the right nostril. When it occurred it always followed coughing or straining. A few drops might drip on to his pillow first thing of a morning. In these two years he had three attacks of meningitis. He was referred to one of us (D. W. C. N.) by Sir Russell Brain.

Radiography of his skull did not reveal the site of the lesion. (After the fracture had been demonstrated at operation, the radiographs were re-examined to see if the lesion had been shown. Even with foreknowledge the site of the fracture could not be detected.)

Radioactive-sodium test.—This was done as described above. The patties were left in position for 45 minutes. There was hypersecretion of mucus towards the end of the test. The only patties which gave counts significantly above background were the three placed along the right cribriform plate. The counts were anterior pattie 327 a minute ; middle pattie 173 a minute ; and posterior pattie 116 a minute. The plasma radioactivity at the end of the test was 30 counts a minute per ml. For the pattie counts to be due to plasma contamination there would have to be absorbed 4–11 ml. of plasma or 7–20 ml. of blood. This was manifestly not the case.

Findings at operation.—From these results it was assumed that the lesion was related to the anterior end of the right cribriform plate. This assumption was entirely justified by the findings at operation on Oct. 12, 1955. There was a defect measuring about 0·7 × 0·3 cm. in the anterior extremity of the right cribriform plate, and overlying this was a rent in the dura mater, whose margins were adherent to those of the hole in the bone. Brain tissue was adherent in places. It seems likely that there had been a fracture of the ethmoid, but no fragment of bone was discovered. The fistulous opening was repaired with a muscle and fascial graft, and convalescence was uneventful.

Case 2.—A man, aged 36, had been involved in a motor-cycle accident eleven years previously. An open fracture of the skull involving the frontal sinus was repaired at operation. Two years later he developed intermittent rhinorrhœa from

his left nostril. This came on at varying intervals (one to three weeks) and continued for a few hours or a day. It was preceded by a throbbing frontal headache, which was relieved by the rhinorrhœa. This symptom had continued up to the present time. He also had post-traumatic epilepsy (grand and petit mal) and severe episodic headaches. He was at one time under the care of a psychiatrist whose opinion was that the patient was a worrying type of man who periodically had bouts of depression. The patient's intellectual capacity was reduced since his accident. He came under the care of one of us (D. W. C. N.) four years ago and was admitted to hospital for investigation.

On admission he bore the scar of the operation on his skull seven years previously and had an intermittent watery discharge from his left nostril. This fluid contained chloride 724 mg. per 100 ml. and sugar 26 mg. per 100 ml. On another occasion it contained, in the morning, chloride 848 mg. per 100 ml., and in the afternoon of the same day chloride 678 mg. per 100 ml. and sugar 8 mg. per 100 ml. Radiography did not reveal the previous injury or other abnormality. Air-encephalography was normal. A blood-count showed 5900 leucocytes per c.mm. (eosinophils 2%). It was decided to postpone operation.

Progress.—The patient continued to attend the follow-up clinic regularly, and his symptoms remained the same. A year later he was admitted to another hospital with an attack of bronchial asthma. He had an eosinophilia of 17% (absolute count not available).

Operation.—A year ago bilateral exploration of his frontal region was decided on. At operation (Mr. W. J. Atkinson) a dural diverticulum was found leading into a hole in the posterior wall of the left frontal sinus, and fragmentation of the crista galli. The dural lesion was closed by sutures, and the hole in the sinus was plugged.

Postoperative course.—The patient made a good recovery from the operation. During his three weeks in hospital after operation there was no nasal discharge. During the next month, at a convalescent home, he had three episodes of rhinorrhœa, two of which followed bouts of sneezing. After this, according to the patient, the rhinorrhœa was worse than ever. He was readmitted to hospital but during a stay of two weeks no rhinorrhœa was observed. A blood-count showed 15,800 leucocytes per c.mm. (eosinophils 9%—i.e., 1422 per c.mm.). He attended as an outpatient and continued to complain of headaches and rhinorrhœa, though the latter was never observed in the outpatient department.

Radioactive-sodium test.—Recently he was readmitted for one day for the radioactive-sodium test. The patties were left in position for 45 minutes. There was an extremely profuse discharge of mucus towards the end of the test. There was not a significant count on any single pattie.

Is this patient's present rhinorrhœa due to a C.S.F. leak or an "allergic vasomotor rhinitis"? The radioactive-sodium test gave no evidence of a C.S.F. leak. The episode of bronchial asthma, the sneezing said to precede the discharge, and the considerable eosinophilia found on two occasions suggest that it might be an allergic phenomenon. A third possibility is that it is a hallucination, insight into which is impossible in a man of lowered intelligence and emotional instability. The rhinorrhœa has not been observed by us since his operation a year ago. Case 1, a doctor of high intelligence, described such a postoperative hallucination in his own case: he felt that his nostril was dripping fluid but found it quite dry when he touched it.

Discussion

Although this paper is based on the experience of only two cases, we feel that the accuracy of the localisation of the lesion in case 1 justifies this early communication.

Identification of C.S.F. Rhinorrhœa

The injection of a dye into the C.S.F. to colour the rhinorrhœa has been successfully used to prove that a rhinorrhœa is C.S.F. (Fox 1933, Lewin 1954). In Fox's case the discharge was very profuse (20 ml. could be collected in 30 minutes). In slow or occult C.S.F. leaks (sometimes manifested only by recurrent attacks of meningitis following head injury) the dye method is unlikely to be useful. Since the radioactive isotope method is more sensitive it is more likely to show when a C.S.F. leak is present. It is conclusive proof that a C.S.F. leak into the nasopharynx is present when a pattie contains radioactivity in an amount which, in the circumstances, could not have come from the plasma.

It is argued above that the classical teaching, that a watery rhinorrhœa which contains sugar must be C.S.F., may be wrong. In view of this, and the undesirability of unnecessary craniotomy, we suggest that, where doubt exists, a radioactive-isotope test should be made.

Localisation of C.S.F. Fistula

Since the positioning of a craniotomy may be decided on the strength of the results of this test, it is essential that the patties be accurately placed in the nasopharynx. To prevent confusion, the position of each pattie and the number of knots on its thread should be recorded when it is put in position.

In case 1 the counts a minute per pattie on the right anterior, middle, and posterior parts of the cribriform plate were respectively 327, 173, and 116. This shows that, for accurate localisation, multiple patties are necessary.

Duration of Test

In Fox's (1933) case the profuse rhinorrhœa was stained fifteen minutes after the injection of 5 ml. of 0·6% indigo-carmine into the lumbar C.S.F. On this evidence, and the results in case 1, it is likely to be sufficient to leave the patties in position for forty to sixty minutes after the injection of radioactive sodium into the cisterna magna when the rhinorrhœa is moderate or profuse. With slow or occult C.S.F. leaks it may be necessary to leave the patties in position longer to get significant counts on them. The length of time the patties may be left is governed by how long they will remain accurately positioned in the nasopharynx.

It is well known that C.S.F. rhinorrhœa may be intermittent, and that the leak may be absolutely sealed during periods of remission. In view of this a negative result obtained during a period of remission should not be accepted as proof that a fistula does not exist.

Occasions when such a test as this may be needed in any one unit are likely to be few. We should therefore be glad to learn of the experience of others who may have recourse to this or similar tests.

Summary

A test for identifying and localising a C.S.F. fistula, using radioactive sodium (^{24}Na), has been applied successfully in 2 cases.

This test may prove more reliable than dye tests.

Expenses incurred in this work were covered by a grant to one of us (H. J. C.) from the London Hospital Research Fund; we wish to thank Mr. D. G. Arnott, B.SC., and Mr. A. R. Joy, for their assistance.

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ADDENDUM

Since this paper was submitted, we have obtained some evidence about sugar in rhinorrhœa fluid. We have to thank Mr. Bowen Davies, F.R.C.S., for permission to publish this material, and Miss P. K. Orton, F.R.C.S., for her help in finding a suitable case to study.

The patient, a man aged 44, had a three-year history of nasal obstruction and right-sided rhinorrhœa. This was associated with sneezing and was profuse and watery; it occurred weekly. The septum was deviated to the right, and there was a right posterior polyp. A sample of the fluid contained 17 mg. sugar per 100 ml. Since submucous resection of the septum and polypectomy ten weeks ago, the patient has had no further rhinorrhœa.

This seems to be conclusive evidence that the finding of sugar in a watery rhinorrhœa is not proof that the fluid is C.S.F.

PENICILLIN BY MOUTH

LABORATORY STUDIES OF ABSORPTION OF PENICILLIN V

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SINCE the early days of penicillin administration, many different types of penicillin have been used. These mostly fall into two groups: the first contains the sodium, potassium, and calcium salts of various naturally occurring antimicrobial organic acids produced by *Penicillium notatum* or by *P. chrysogenum*, of which the highly potent benzylpenicillin (penicillin G) is the most commonly used; and the second comprises the various salts of benzylpenicillin with organic bases, which alter the rate of absorption—e.g., benethamine, benzathine, and procaine penicillins.

Phenoxymethylpenicillin (penicillin V) was first prepared in the United States by Behrens et al. (1948) by "biosynthesis." In this process a precursor, N-(2-hydroxyethyl)-phenoxyacetamide, is added to the broth during the fermentation of the penicillium. The therapeutic potentialities of the stability of penicillin V in acid milieus were, however, first recognised in Austria. Brunner (1953) and Brandl and Margreiter (1954) showed penicillin V to be about five times as resistant to acid inactivation as penicillin G and to be relatively stable in crystalline form as the free acid (the form in which it is now usually prepared and marketed); they further claimed that this acid stability was associated with a high absorbability from the intestinal tract when the antibiotic was given by mouth. The first reports of its clinical use on the Continent (Hausmann and Zischinsky 1953, Schindelmeisser 1954, Sinios 1954) and more recently in America (Martin et al. 1955) led to renewed interest in the oral use of penicillin in this country and to the clinical trial of penicillin V by Hart et al. (1956).

Relatively little detailed information is available about the absorption of penicillin V and the levels that may be expected in the blood during treatment. We report here the results of laboratory studies of healthy volunteers after various oral doses of penicillin G and penicillin V. The aims of our trials were (1) to confirm that higher blood-levels are obtained after penicillin V than after penicillin G; (2) to determine whether there is less individual variation in the absorption of penicillin V than of penicillin G; and (3) to ascertain the duration of adequate therapeutic levels after single oral doses of penicillin V.

A difficulty arises in comparing the blood-levels of these two penicillins because the biological activity of penicillin V differs slightly from that of penicillin G. For example, whereas penicillin V resembles penicillin G closely in its activity against *Bacillus subtilis*, it is considerably less active against *Sarcina lutea* and in general somewhat more active against *Staphylococcus aureus*. Thus it is impossible to make a valid assay of one penicillin in terms of the other. Martin et al. (1955), Wright et al. (1955), and Kylin (1955) have, however, shown that, while individual strains of a bacterial species may differ in sensitivity to penicillin G and to penicillin V, there is little over-all difference in the sensitivity of the species most commonly pathogenic to man, such as the staphylococci and streptococci. Thus, although we can directly assay penicillin G only in terms of an international standard preparation of G expressed in units, and penicillin V in terms of a reference standard of V by weight, the potency of the two penicillins may be indirectly related on the assumption that 1 mg. of penicillin V has an activity approximately equivalent to 1700 units of penicillin G (Behrens et al. 1948, Brandl and Margreiter 1954). Accordingly, in this paper we express levels of penicillin V in units per ml. as defined above, instead of in terms of an arbitrary standard of penicillin V. This procedure has the advantage of indicating, for clinical purposes, the rough equivalence of levels of penicillin V with those of penicillin G, the therapeutic significance of which is already well established.

Methods

Oral penicillin was given to volunteers (healthy medical students or laboratory workers) two hours after a light breakfast; no more food was consumed during the next hour. 5 volunteers received an intramuscular injection of 100,000 units of sodium benzylpenicillin into the deltoid.

The blood samples were obtained by venepuncture; the serum was separated from the clot within a few hours and stored at 5°C. Sera were tested within three days of withdrawal, the majority within twenty-four hours.

The method of assay was essentially the modified cup-plate technique of Humphrey and Lightbown (1952), fish-spine beads being used as cups. The serum-penicillin level was calculated from the zones of inhibition of a standard suspension of *Sarcina lutea* (C.P.1001) cultured in the U.S. Food and Drug Administration medium (*British Pharmacopœia* 1953), the sera being diluted when necessary in 0·1M phosphate buffer at pH 7·0 so that the zone diameter was of the same order as that given by the standard solutions. Each assay plate (12 × 12 in.) was of uniform depth and accommodated 36 cups containing 6 replicates of two penicillin standards and of 4 unknowns, arranged in a 6 × 6 Latin square; the plates were incubated at 27°C for eighteen hours. The standards in the assay of penicillin V were 0·5 μg. per ml. and 0·0625 μg. per ml., and in that of penicillin G 0·4 unit per ml. and 0·05 unit per ml. These were prepared in the phosphate buffer from a pure sample of phenoxymethylpenicillin provided by the Distillers' Company and from a "manufacturer's standard" of benzylpenicillin of 1676 units per mg. The serum level of penicillin V was finally expressed in units per ml. as defined above.

Results

Absorption and Persistence of Penicillins G and V in Blood.—The serum-penicillin levels in laboratory workers were determined at various intervals after single doses of penicillin. None of these workers had a history of previous penicillin sensitisation, and no ill effects were observed after the administration of any of the penicillin preparations. The preparations used were tablets of proprietary penicillin G (unbuffered potassium salt) and penicillin V and capsules of a calcium-penicillin V dihydrate. As the levels obtained varied considerably, the results are presented in full in the accompanying table. Two points should be noted: (1) the levels attained after 120 mg. of both penicillin V preparations are about equal to those after twice this dose of penicillin G; and (2) penicillin V is absorbed more slowly than penicillin G. Thus the maximal blood-level of penicillin G was reached before one hour in most cases, whereas in only 4 of 10 subjects receiving penicillin V was the peak reached before one hour. In some instances the highest level of penicilin V was found in the two-hour blood sample.

Penicillin Level an Hour after Ingestion.—29 students were bled an hour after an oral dose of 120 mg. of penicillin V; a few days later 11 of them received 200,000 units (120 mg.) of penicillin G, and 14 twice this dose. The mean penicillin levels were 12·8 units per ml. of penicillin V and 0·28 and 0·49 unit per ml. of penicillin G; the number of sera containing more than 0·5 unit per ml. were 25 of 29 after 120 mg. of penicillin V, 3 of 11 after 120 mg. of penicillin G, and 7 of 14 after 240 mg. of penicillin G. Other volunteers received larger doses of

these preparations. The doses were prescribed without regard to the volunteers' body-weights. When the serum level is plotted against the dose per kg. body-weight (fig. 1), there is a consistent rise in level with the dose of penicillin V; whereas for penicillin G the slope of dosage/response curve is much less.

Discussion

This paper is not immediately concerned with arguments for and against oral penicillin therapy. We feel, however, that the claim that a particular penicillin is better absorbed from the alimentary tract is not one to be dismissed lightly as of purely academic interest, since some 40 tons of penicillin are used annually in the U.S.A. in the manufacture of oral penicillin tablets (Welch 1956), and since, according to a Ministry of Health estimate, of the penicillin prescribed by general practitioners in the National Health Service the ratio of oral to injected was 3 to 1 in 1954.

Our findings, which are in general agreement with those of Wright et al. (1955) and Martin et al. (1955), fully confirm the Austrian claims that penicillin V produces blood-levels considerably higher than those of an equal dose of penicillin G; and they suggest that penicillin V represents a distinct step towards meeting one of the major objections to the oral use of penicillin—namely, the need to use much larger doses than with parenteral administration.

A second objection is more difficult to answer—namely, the occasional poor absorption of penicillin given by mouth to adults. This failure of absorption is attributed to the existence of "non-absorbers"; thus insignificant blood-levels have not infrequently been found after oral doses of 50–100,000 units of penicillin G, occasionally after doses of 200,000 units (Welch 1956), and more rarely after larger doses. With the doses we used, no non-absorbers of either penicillin G or penicillin V were found among the 41 volunteers examined, though with the smaller doses of penicillin G poor absorption was often noted. We must point out, however, that our numbers are too small to exclude the existence of a substantial proportion of non-absorbers in the adult population.

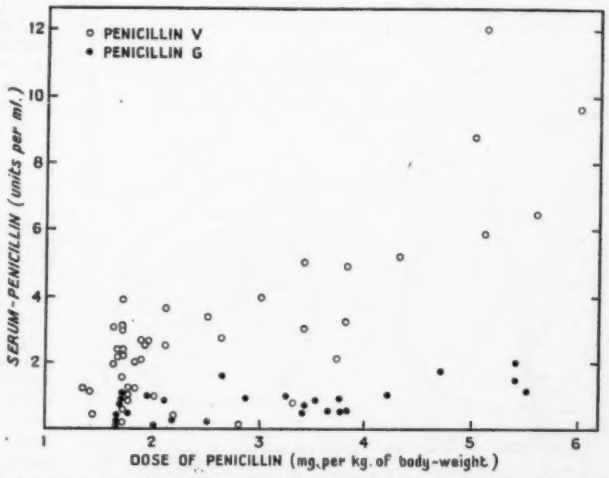

Fig. 1—Serum-penicillin levels an hour after various oral doses of penicillins V and G.

LEVELS OF PENICILLIN G AND V IN SERUM AFTER A SINGLE DOSE

Penicillin			Subject	Serum-penicillin level (units per ml.) after				
Type	Route	Dose		½ hr.	1 hr.	2 hr.	4 hr.	6 hr.
G	I.M.	60 mg. (100,000 u.)	A	2·65	0·81	0·11	0·02	–
			B	2·65	1·79	0·54	0·07	–
			D	2·61	1·01	0·24	0·02	–
			K	2·48	1·17	0·20	0·02	–
			L	1·70	0·34	0·08	0·02	–
			Mean	2·42	1·22	0·23	0·03	
G	Oral	240 mg. (400,000 u.)	A	0·63	0·59	0·27	–	–
			B	0·97	0·80	0·30	–	–
			C	0·33	0·47	0·18	–	–
			D	0·29	0·19	–	<0·02	–
			F	0·71	0·58	–	0·06	–
			Mean	0·59	0·53	0·25		
V (acid)	Oral	120 mg. (200,000 u.)	A	0·24	0·42	–	0·03	–
			B	0·19	1·20	–	–	<0·03
			C	0·68	0·79	–	0·07	–
			D	0·09	0·63	–	0·07	–
			E	0·14	–	0·44	0·06	–
			F	–	1·28	0·24	–	Nil
			G	1·20	0·93	0·20	–	–
			H	–	0·70	0·19	–	Nil
			I	–	0·12	1·14	0·09	–
			J	–	0·26	0·49	–	<0·03
			Mean	0·42	0·69	0·45	0·06	
V (calcium salt)	Oral	120 mg. (200,000 u.)	E	0·12	–	0·46	<0·03	–
			F	<0·03	0·14	–	–	<0·03
			G	0·54	0·51	0·29	–	–
			I	–	0·14	0·14	<0·03	–
			J	–	0·39	0·32	–	Nil
			Mean	0·22	0·30	0·30		
V (calcium salt)	Oral	240 mg. (400,000 u.)	B	–	1·52	–	0·29	<0·03
			F	<0·03	0·05	–	0·31	–
			G	4·90	3·20	0·29	–	–
			K	1·70	1·44	–	0·03	–
			L	–	3·15	0·29	–	<0·03
			Mean	2·20	1·87	0·29	0·21	

–, not tested.
<0·03, inhibition but insufficient for assay.
Nil, no inhibition.

Factors which affect absorption of penicillin from the gastro-intestinal tract include the presence of food in the stomach and intestine, delay in stomach emptying, and the disintegration time of the tablet. Jones and Finland (1955) found that the optimal absorption of penicillin V took place after a small meal when rapidly disintegrating tablets were used; and penicillin G was best absorbed from an unbuffered preparation at a time of fasting. All our observations were made one and a half to two hours after a light breakfast—i.e., in a state of semi-fasting; both penicillin-V and penicillin-G tablets gave disintegration times of between five and ten minutes in the disintegration test of the *British Pharmacopœia*. Under these conditions the peak blood-level of penicillin V may not be reached within two hours; thus estimations made at one hour only, may in some cases give a false picture of absorption, as instanced by volunteers F, J, and I (see table). With penicillin G the peak is reached within an hour; and, as the level half an hour after a dose does not differ greatly from that at one hour, a single observation at one hour probably gives a fair estimate of the absorption. Our observations and those of others show that the range of blood-penicillin levels for a given dose of either penicillin G or penicillin V is very great; this can be partly explained by variations in weight of the subjects; but our scattergram (fig. 1) clearly indicates that even on a dose/weight basis the variation is still very considerable. The extent of this variation may well account for some of the reported non-absorbers; it will be evident from fig. 1 that, if smaller doses of penicillin G had been given, many of our subjects would have appeared as non-absorbers.

For the same reasons we believe that the greater success obtained in children with oral penicillin therapy is due, at least in part, to the very much larger dosage.

Cathie and MacFarlane (1953) gave a standard dose of 300,000 units (180 mg.) of benzathine penicillin six-hourly to

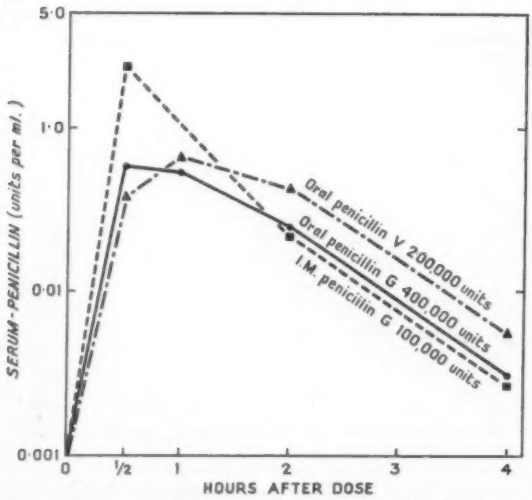

Fig. 2.—Mean serum-penicillin levels after intramuscular injection of 100,000 units of penicillin G and after oral doses of 400,000 units of penicillin G and 200,000 units of penicillin V.

children weighing from less than 10 lb. to more than 70 lb. —i.e., doses of 6–36 mg. per kg. body-weight. Beasley and MacPherson (1954) gave benzathine penicillin in doses of 12,000–18,000 units per lb. body-weight—i.e., 16–24 mg. per kg. body-weight. A minimal dose of 6000 units of penicillin G per lb. (8 mg. per kg.) of body-weight was recommended by Doxiadis et al. (1951).

Claims that benzathine penicillin is better absorbed than penicillin G from the alimentary tract were not substantiated by later workers (Bayne et al. 1953, Fairbrother and Daber 1954), and the sole advantage of this penicillin in oral therapy is probably its less bitter taste, an advantage shared by penicillin V.

Our results suggest that, if adequate doses in relation to weight are given to adults, blood-levels similar to those obtained in children will be achieved.

The proportion of the dose of penicillin which is excreted in the urine is probably one of the best indices of absorption. Heatley (1956) found that a larger and much more constant proportion of the dose is excreted in the urine after oral administration of penicillin V than of penicillin G; when penicillin was fed to a fasting person on three occasions, the recovery-rates of penicillin G were 13–25% and of penicillin V 22–26%; after a light meal the rates were 4–11% for penicillin G and 20–27% for penicillin V. Wright et al. (1955) gave oral doses of these penicillins to 30 volunteers under controlled (but unspecified) conditions and concluded that about twice as much penicillin V as penicillin G is excreted after an oral dose (about 25% and 12% respectively); the proportion for parenteral penicillin G is about 60%. The blood-penicillin levels achieved in our experiments reveal a similar relationship. Fig. 2 shows the average blood-levels after doses of 100,000 units of sodium penicillin intramuscularly, 200,000 units of phenoxymethylpenicillin orally, and 400,000 units of sodium penicillin orally. The shapes of the curves are very similar. As would be expected, absorption of the intramuscular dose is more rapid, and the level after half an hour is considerably higher than after either of the oral doses; but the difference is much less after one hour, and after two hours the level is very similar to that found when penicillin G has been given orally in four times the intramuscular dose. Penicillin V reaches its peak more slowly, but the level after two hours is about twice as high as that obtained with half the parenteral dose, or twice the oral dose, of penicillin G.

In view of the different biological potency of the two penicillins, the final test of adequate dosage must be that of therapeutic efficacy in man. Meanwhile, however, we may assume that the total daily dose of penicillin V should be not less than twice the dose of parenteral crystalline penicillin G that would be given in the particular clinical circumstances.

Summary

Single doses of penicillin G or of one of two preparations of penicillin V (phenoxymethylpenicillin) were given by mouth to healthy adult volunteers two hours after a light breakfast.

In a few of the subjects the venous serum-penicillin level was determined at ½, 1, 2, 4, and 6 hours after doses of 200,000 units (120 mg.) or 400,000 units (240 mg.). The levels after 200,000 units of penicillin V were in general equal to those attained after twice that dose of penicillin G. The highest level of penicillin G was usually reached within one hour; penicillin V was absorbed more slowly, the peak being usually between one and two hours. With these doses of penicillin V a detectable amount of penicillin was maintained in the blood for four to six hours.

Blood samples were obtained from 29 volunteers an hour after ingesting 200,000 units (120 mg.) of penicillin V; the mean penicillin level was 1·28 units per ml. A few days later the same volunteers received the same dose or twice the dose of penicillin G; the mean level an hour after 200,000 units (120 mg.) of penicillin G was 0·28 unit per ml. and after 400,000 units (240 mg.) was 0·49 unit per ml. A few subjects received doses of 600,000–800,000 units, serum levels of 4–12 units per ml. being attained with penicillin V and of about 1–2·5 units per ml. with penicillin G.

When the serum-penicillin level was plotted against the dose per unit body-weight, there was a more pronounced rise of level with the increasing dose of penicillin V than of penicillin G. This is considered additional evidence that penicillin V is better absorbed from the gastro-intestinal tract than penicillin G. This absorption, however, is considerably less than that resulting from parenteral administration, and the total daily dose of penicillin V should be at least twice the dose of parenteral crystalline penicillin that would be given.

We should like to thank all the laboratory workers and medical students who took part in these trials and especially Dr. P. Farthing and Mr. P. Tidman, A.I.M.L.T., for their help in the assays. We are grateful to Dr. J. H. Humphrey for much valuable advice; to the Department of Biological Standards, National Institute for Medical Research, for providing the penicillin-G standard; and to the Distillers' Company Ltd. for the penicillin-V standard. The calcium dihydrate salt of penicillin V was the gift of Leo Pharmaceuticals of Copenhagen.

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A METHOD OF HÆMOSTASIS IN PROSTATIC SURGERY

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THOUGH most of the technical difficulties of prostatectomy have been overcome, bleeding from the prostatic cavity remains a considerable problem. Present methods of coping with it are at best anatomically unfounded, at worst surgically suspect, and always dangerously unpredictable. It is the biggest postoperative hazard when the bladder is closed.

The following method is simple to apply, and ensures effective hæmostasis after the modern transvesical operation. It makes use of the perineal stitch, the principle of which was described by Dr. Edward L. Keyes, of New York, nearly 45 years ago. The method is particularly useful when enucleating a benign adenoma, but it can equally be applied to a fibrous prostate, or to a V-section for carcinoma. I believe that it significantly lowers the risk of prostatectomy.

Technique

Position of the Patient

The perineum must be available in the operation area. The patient is placed in the "semi-lithotomy" position with the lithotomy leg pieces at their lowest and at their farthest down the table. As the buttocks are not drawn down to the end of the table, the thighs remain almost fully extended and abducted at the hips. With the surgeon standing on the patient's left side both the suprapubic area and the perineum are readily accessible to him (fig. 1).

A small wound towel is stitched across the perineum horizontally just anterior to the anus. This separates

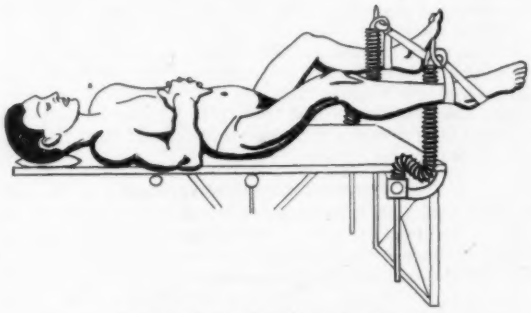

Fig. 1—Patient's position on the table.

the anal canal from the anterior perineal area which is part of the operating field. The scrotum is pulled out of the way and fixed with a towel-clip to the skin over the right iliac fossa.

Instruments

No new instrument is required. It is necessary, however, to have a hole, $^1/_{16}$ in. across, bored through the end of a curved metal urethral bougie.

The Operation

The surgeon stands on the patient's left side. The bladder is opened suprapubically and its inside inspected. The prostatic enlargement is enucleated with the right hand; the left index finger pressing on the prostate from the rectum. (The semi-lithotomy position is particularly favourable for this part of the operation.) The gloves are changed and a clean towel is applied across the perineal end of the table. A retractor is placed in the bladder and the prostatic cavity is inspected from above. A V-cut can be made in the trigone if necessary.

A long nylon stitch is passed through the bladder neck from the prostatic cavity into the bladder, and back from the bladder into the prostatic cavity. The

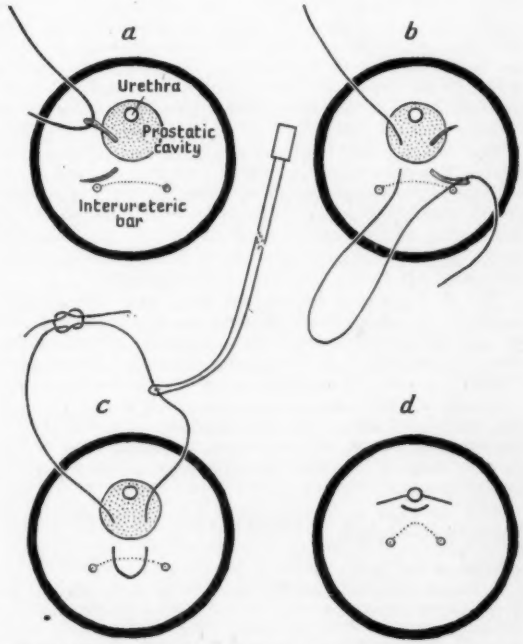

Fig. 2—Stitch through the bladder neck. Traction on the stitch from the perineum controls the bleeding from the prostatic cavity (*d*).

stitch is sited near the midline; it takes a good bite of the bladder neck, and leaves the loop on the bladder mucosa with the free ends in the prostatic cavity. One free end of the nylon is threaded through the hole in the metal bougie and the two ends are knotted (fig. 2). The metal bougie is then made to carry the nylon into the perineal urethra in the following way: a rubber catheter is passed along the urethra, from the external urinary meatus into the bladder, where its end is secured. About an inch of this end is cut off, and the slightly

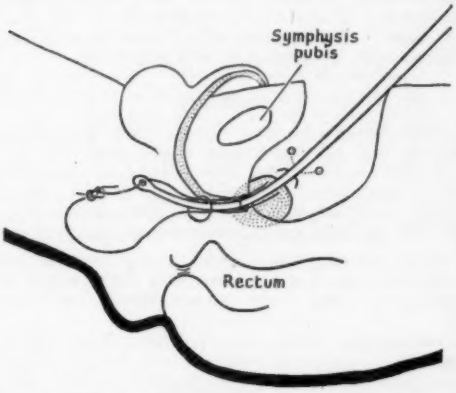

Fig. 3—Delivery of the perineal stitch by cutting down on the metal bougie.

bulbous termination of the metal bougie—carrying the nylon stitch—is inserted into the lumen of the catheter. Assisted by traction on the penile end of the catheter, the catheter and bougie are guided into the urethra. When the metal end of the bougie is accurately located by feel in the perineum, the rubber catheter is withdrawn.

The point of the bougie is cut down upon in the perineum. The nylon stitch is delivered through the stab wound (fig. 3) and detached from the bougie; but the bougie is not yet withdrawn. Traction on the nylon stitch in the perineum draws the bladder neck into the prostatic cavity, and hæmorrhage can be demonstrated to be controlled (fig. 2*d*).

The catheter with the end cut off is now drawn over the end of the metal bougie in the perineal stab; it is fixed to the bougie by an encircling ligature and withdrawn into the bladder. The catheter is detached from the metal bougie and placed nicely in the bladder neck. It is fixed in this position by a stitch through the skin where it issues from the perineal wound.

The two ends of the nylon stitch are brought out through the skin, through separate needle holes, one on each side of the perineal stab. Traction on the bladder neck is maintained by tying this stitch firmly round a "dolly" made of a rolled-up gauze mop.

10 ml. of 10% sodium citrate solution is put through the perineal catheter into the bladder. The bladder is sewn up in two layers; a small drainage tube is left in the cave of Retzius, and the suprapubic wound is firmly closed.

The average operating time for these procedures has been 35 minutes.

Postoperative Care

1 million units of penicillin and 0·5 g. streptomycin are given at the end of the operation. A further 250,000 units of penicillin is given 6-hourly, and 0·5 g. streptomycin twice daily, for 4 days. 0·5 g. 'Sulphatriad' is then given by mouth 6-hourly for another week. The patient is encouraged to take fluids, and he is allowed to get out of bed the day after the operation.

During the first 24 hours, if the catheter does not run freely, it is gently irrigated with sterile 10% sodium citrate.

With the catheter in the perineum the patient usually passes urine per urethram on the second day. This encourages him greatly. The catheter and the perineal hæmostatic stitch can be safely removed after 48 hours, or on the morning of the second postoperative day, whichever is sooner. The hæmostatic stitch is cut on one side of the "dolly"; and it slides out easily, especially if the ends have been left long after knotting. There is usually a sharp venous bleed from the perineal stab, but this is instantly controlled by a firm pad and T-bandage. Urine is passed within a few hours of removal of the catheter without pain or hæmorrhage.

Summary

A safe method of controlling hæmorrhage from the prostatic bed by a perineal stitch introduced under direct vision is described. The method is combined with perineal catheter drainage which greatly facilitates nursing, and sometimes allows the patient to pass urine per urethram on the second postoperative day.

I thank Mr. Harry Brown and Mr. Hugh Roberts, of Jones Brothers (Bangor) Ltd., for arranging the alteration to the bougie; and Messrs. Denis Ferranti Meters, for boring the hole.

I acknowledge, anew, the cheerful coöperation of the artist.

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LATE HÆMORRHAGE AFTER OPEN PROSTATECTOMY

ARREST BY USE OF RESECTOSCOPE

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PROSTATECTOMY differs from other operations in that postoperative bleeding is inevitable. The consequent loss of blood should be limited to venous oozing from the prostatic cavity, gradually diminishing and allowing the catheter to be removed with safety at the end of forty-eight hours. The amount of postoperative hæmaturia bears a direct relationship to the completeness of hæmostasis at operation. Nevertheless, despite careful hæmostasis and antibiotics, there may still be severe postoperative hæmorrhage. This remains the greatest hazard in the postoperative period. It is a complication which any surgeon doing a prostatectomy must be prepared to cope with effectively. "Effectively" implies absolute and permanent cessation of bleeding.

The only certain way to stop the bleeding effectively is by passing a resectoscope, evacuating all blood-clot, and arresting the hæmorrhage by diathermy. This should be done as soon as severe postoperative bleeding takes place, so that loss of blood is curtailed and the need for cystotomy after failed conservative measures does not arise.

Blood-supply of Prostate Gland

The main arterial supply of the prostate gland is from the inferior vesical artery and a few anastomosing branches from the middle hæmorrhoidal. Running forward and medially across the floor of the pelvis the inferior vesical artery of either side comes to lie in the prostatovesical groove on the inferolateral aspect of the bladder, which it supplies besides giving small branches to the ureter and seminal vesicle (fig. 1). In the groove it divides into internal or urethral branches and external or capsular branches. The internal branches supply the bladder neck and prostate. The inferior vesical arteries are the main arterial supply to the prostate, entering the gland at 4 o'clock and 8 o'clock on the posterolateral aspect of the bladder neck (fig. 2). The main vessel on each side can be secured, before it divides, by a deeply placed lateral suture as it lies in the commissure between the bladder and prostate.

Postoperative Hæmorrhage

This can either be venous or arterial—usually venous from the prostatic cavity and arterial from the bladder neck. Since exsanguinating postoperative hæmorrhage is always arterial, it is hæmostasis at the bladder neck which is important. Suture of the bladder neck at the site of entrance of the internal branch of the inferior vesical artery eliminates the complication of reactionary hæmorrhage, which is here defined as bleeding during the forty-eight hours after operation. In my experience reactionary hæmorrhage has not presented any problems, and only 1 case has required more than simple measures.

Late hæmorrhage, here defined as bleeding after removal of the catheter, is far more serious. The catheter has been removed, and a state of complete clot retention may arise without warning hæmaturia, the patient being in great pain, unable to void, and with a tense bladder full of clot. If hæmaturia occurs in a patient with infected urine it should be regarded with grave concern because severe late hæmorrhage may be imminent.

The Management of Postoperative Hæmorrhage

Use of Resectoscope

The use of the resectoscope to arrest severe or persistent hæmorrhage following open prostatectomy is not widely

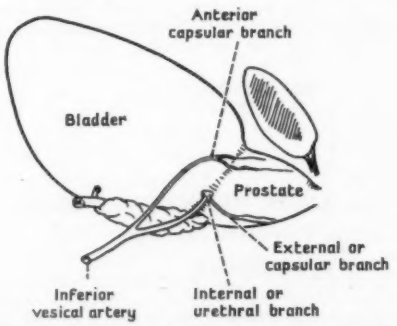

Fig. 1—Lateral view of prostate and bladder, showing distribution of inferior vesical artery.

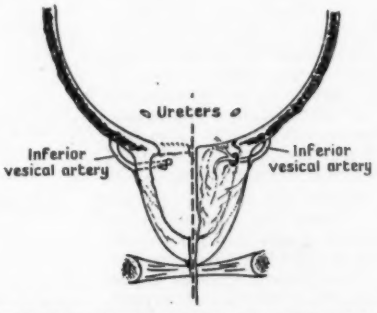

Fig. 2—Coronal section through bladder and prostate, showing arterial supply (adenoma removed on the right side).

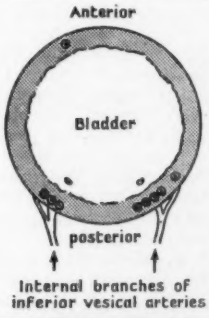

Fig. 4—Bladder neck viewed from below, showing sites of bleeding in 9 cases reviewed.

known. At a meeting of the American Association of Genito-Urinary Surgeons in 1915 Hinman (cited by Davis 1948) stated that bleeding following the punch operation could be arrested by perurethral diathermy using an ordinary cystoscope. Davis (1932) drew attention to this method of controlling secondary hæmorrhage after enucleation of the prostate. Still its possibilities were not appreciated, for it was not until Davis (1948) reported the routine use of perurethral diathermy to deal with postoperative hæmorrhage. In his personal series of 486 prostatectomies there was no death from hæmorrhage, and for thirteen years no bladder had been opened or packed by him. He believed, as I do, that intervention should be early in every case where serious bleeding is taking place—a radical and fundamental change from the previous principle that one should wait until forced to open the bladder.

The old method of dealing with severe postoperative hæmorrhage was to catheterise the patient, evacuate the clot, and try to keep pace with arterial bleeding by continual bladder lavage and blood-transfusion. (Instillation of pepsin and glycerin or of streptokinase and streptodornase in an attempt to liquefy the clot has usually been unsuccessful in my experience.) Only when these measures failed, and the patient's blood and strength had been frittered away, was the patient taken back to the theatre. There, under general anæsthesia, the clot was evacuated and bleeding controlled by traction on a Foley catheter. If this failed, cystotomy had to be done and the prostatic cavity packed—both blind procedures. It was not realised that it was always one artery that was bleeding.

This method is unsatisfactory. It seems reasonable, after evacuating the clot, to locate and coagulate the source of hæmorrhage.

The resectoscope is an admirable instrument through which to do this. It has a straight, smooth, thin-walled wide-bore sheath to which all the fitments necessary for evacuation and diathermy are standard and rapidly interchangeable. The field of the telescope is fore-oblique, and a good view is always obtained, even in the presence of severe bleeding, because the irrigating fluid washes the blood away from the objective (fig. 3). Since the sheath is perfectly round, the close-fitting obturator makes an admirable piston and, if withdrawn quickly, acts as a powerful syringe to dislodge any stubborn thick clot which may block the instrument.

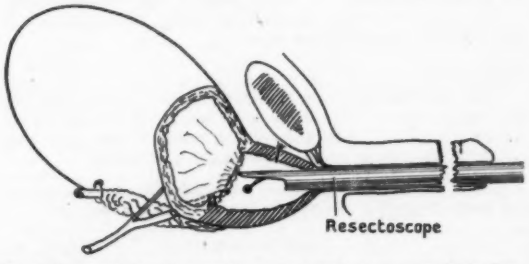

Fig. 3—Sagittal view of prostatic cavity with resectoscope in position.

Procedure

By the time the patient has been prepared for the theatre, blood should be available and a transfusion started to replace the blood lost, which is usually more than estimated.

The bladder is emptied under general anæsthesia with the patient in the lithotomy position. Either a McCarthy or a Nesbit resectoscope is used, to which an Ellik's evacuator or a Thompson syringe is readily attachable.

ANALYSIS OF CASES OF HÆMORRHAGE

Case no.	Type of hæmorrhage	Post-operative day	Infection	Warning	Estimated blood-loss (pints)	Site of bleeding (o'clock)
1	Reactionary	0	—	Yes	. .	7
2	Secondary	10	+	None	2–3	5
3	Secondary	11	+	None	2	11
4	Secondary	6	+	None	2–3	7
5	Secondary	6 and 16	+	None	2–3	4
6	Secondary	3	—	None	. .	5
7	Secondary	5	+	None	3	7
8	Secondary	13	+	None	1½–2	5
9	Secondary	4	—	None	2–3	5

The urethra is gently dilated with metal bougies, indicating the size of resectoscope sheath that can be used without fear of late formation of a stricture. Evacuation of clot is a slow process even with an Ellik's all-glass evacuator, which eliminates the air leaks which were a feature of the Bigelow instrument. If the bladder is tense, some of the contents should be aspirated before using the Ellik, because this may cause overdistension or a leak through the prostatic suture line. This aspiration is best done with either a Thompson syringe or by utilising the piston-like action of the obturator.

The blood-clot, which is broken up by the powerful to-and-fro swirling action of the Ellik, settles in its lower reservoir and thus is not returned to the bladder. It is better to use two or three evacuators in rotation to avoid delay when the reservoir is full, for it is not unusual to have to remove 2–3 pints of thick blood and clot.

All blood-clot must be removed before trying to locate the bleeding-point; and, if the returning fluid does not clear, the telescope should be inserted to see whether this is due to adherent clot or active bleeding. If clot remains it can either be dislodged by using an electrode or by

thrusting the sheath into it under vision. When all the clot has been removed, the bleeding-point is sought. The posterolateral quadrants of the bladder neck should be inspected first, for it is there that the main arterial supply enters the gland. It may take a little time to get one's bearings, especially if the prostatic cavity is ragged and the bleeding profuse, but with patience the artery will be seen spurting. If bleeding has ceased, as in two cases of ours, this must not be accepted as final, for careful inspection revealed the site hidden by a small adherent clot which, when dislodged, allowed the artery to restart with all its previous vigour. Coagulation must be exact. If the electrode is manipulated so as to control the vessel by pressure and the current is then switched on, the vessel will be coagulated. Coagulation appears to be more effective if the flow of irrigating fluid is interrupted, so as to prevent dissipation of heat. A final search is made to ensure that there is no other bleeding-point.

It is dramatic to see thick bloody urine become crystal clear, requiring simple catheter drainage for only twelve hours, by which time urinary bacterial sensitivities are known, enabling the appropriate antibiotic to be given.

Review of Cases

In 250 Millin prostatectomies the procedure described above was performed on 9 cases (3·6%). 8 of these were for late hæmorrhage. The only case of reactionary hæmorrhage occurred on the same day as operation. In 6 of the 8 the urine was known to be infected, and in 5 of these the infecting organisms were resistant on admission to hospital (see table).

In no case of late hæmorrhage was there any warning hæmaturia, which might have enabled clot retention to be prevented. A catheter was always passed and irrigation attempted while blood was being cross-matched, but the inadequacy of this procedure, together with the knowledge that the clot could be removed and the bleeding stopped by the use of the resectoscope, prevented us from persisting with conservative measures.

This is an operation of election as well as of necessity, which accounts for the fact that it has been done as many as 10 times (twice on case 5). Late hæmorrhage occurred in 8 patients, reactionary hæmorrhage in 1 patient. In only 1 patient was the bleeding-point away from the bladder neck. In this case it was on the anterior suture line (fig. 4).

Conclusions

The procedure is simple and safe, and its result nearly always permanent, for only once was it necessary to repeat the manœuvre for recurrent hæmorrhage, and this was ten days later. We have had no case of leakage from the capsule, either during or after the procedure. There are no packs or bags to require attention or removal. The incision is undisturbed. The patient's stay in hospital is not usually prolonged, and the patient stands the operation well.

Though we must strive to prevent the complication of late post-prostatectomy hæmorrhage, we need not fear that a patient will die of exsanguination, even if blood is not immediately available. The method is simple—as sure as turning off a tap—and so far there has been no operative mortality.

Summary

A method of arresting late hæmorrhage after open prostatectomy is described, using the resectoscope.

Such bleeding has always been from a single artery.

9 cases of hæmorrhage out of 250 Millin prostatectomies were successfully treated in this way with no operative mortality.

These patients were all operated on in the urological unit of the United Birmingham Hospitals. They were under the care of Mr. Hugh Donovan and Mr. Guy Baines, whom I wish to thank for their kind help and assistance in the preparation of this paper. I would also like to acknowledge my debt to Sister C. B. Nicholas for her unremitting care of these patients.

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AMIPHENAZOLE IN NEONATAL APNŒA DUE TO MORPHINE

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BECAUSE of its superior action in producing analgesia and mental tranquillity, morphine has been generally accepted as the drug of choice in the management of long and painful labour. Unfortunately, however, morphine readily passes through the placenta and depresses the fœtal respiratory centre. The difficulty in breathing which may be caused in this way often gives rise to much anxiety in the mother and her attendants and occasionally it is fatal to the child.

Amiphenazole

2 : 4-Diamino-5-phenylthiazole hydrochloride (amiphenazole, 'Daptazole') is a colourless crystalline compound readily soluble in water and in physiological saline. The solution decomposes on standing and should be used within 24 hours.

McKeogh and Shaw (1956) have given this drug to combat the respiratory depression of large doses of morphine used in the terminal stage of carcinoma. It also relieves the respiratory depression caused by excessive doses of heroin, 'Omnopon,' pethidine, or methadone.

Clinical Trial

Twelve newborn infants with apnœa attributed to morphine have been successfully treated. Amiphenazole was given only to those infants whose mothers had had morphine within three hours of delivery and in whom respiration could not be established within three minutes of birth. Each infant was laid head downwards on an inclined plane and (after the upper respiratory passage had been aspirated with a mucus extractor) was given oxygen from a mask. Amiphenazole 3 mg. in 1 ml. of sterile water was injected into the umbilical vein, and the solution was squeezed along the umbilical cord towards the infant. In each case regular gasping respiration was established within 30–60 seconds of the injection, and this was soon followed by normal pneumotaxis. No adverse side-effects have been observed.

To give the drug to the mother, by intravenous injection, shortly before the infant's delivery would in some ways be preferable; but, by suddenly reducing the morphine analgesia, it may render the labour pains intolerable. For this reason it is better administered to the infants after they are born.

Conclusion

The use of amiphenazole to counteract any respiratory depression which morphine may cause in the newborn infant should enable the obstetrician to employ this valuable analgesic drug more freely and safely.

Messrs. A. and G. Nicholas, the manufacturers, supplied the amiphenazole ('Daptazole') used in this trial.

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McKeogh, J., Shaw, F. H. (1956) *Brit. med. J.* i. 142.

PRIMARY ALDOSTERONISM DUE TO ADRENOCORTICAL HYPERPLASIA

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SINCE the first description by Conn (1955) of the syndrome named after him, observed in a female patient, and successfully treated by surgery, several further cases have been published (Mader and Iseri 1954, 1955, Corcoran 1955, Chalmers et al. 1956). An adrenal tumour (either an adenoma or a carcinoma) has always been found in such cases (Foye and Feichtmeir 1955); but in the case reported here Conn's syndrome was caused by adrenal hyerplasia.

Case-report

A boy, aged 17, was admitted on Nov. 29, 1955, because of high blood-pressure. According to his parents he had drunk excessive amounts of fluid since the age of 2 years. Up to the age of 8 years he had had enuresis. Every night he got up at least once to pass urine and drink water. He also drank great quantities during the daytime. His growth was retarded, and at school he was backward. Of recent years he had passed urine and drunk water two or three times every night. Games, if played energetically, often caused headache and frequent epistaxis, especially in hot weather. He did not tire more easily than the other boys. He never vomited, and his appetite was good. He was very irritable and rapidly lost his temper. He had never had paralysis or muscular weakness. He had smoked a fair amount from the age of 13. He had had only diphtheria and appendicitis, for which he had been operated on. His three sisters, four brothers, and parents were all in good health. A sister, aged 15, had already outgrown him.

Examination

His height was 4 ft. 10 in., arm-span 5 ft. $2^2/_4$ in., and body-weight 7 st. 12 lb. He had no moustache or beard, no axillary hair, and sparse pubic hair (fig. 1). His bone age was 13 years. His blood-pressure varied from 195/125 to 220/150 mm. Hg. His brachial artery felt hard. His pulse was regular, even, and full, and pulse-rate 72. The pulsation of his femoral arteries was clearly felt. His heart-beat was palpable just outside the mid-clavicular line. A systolic murmur was audible at the apex and in the aortic area. Radiography showed that the aorta was much dilated. An electrocardiogram (fig. 2) was typical of hypopotassæmia, with negative T in I, II, AVL, V_4, and V_6 and high U in V_4; QT interval 0·4 sec. Liver and spleen were not enlarged. Retinoscopy (Prof. H. M. Dekking) showed bilateral papillœdema with constricted and contorted vessels.

Laboratory Investigations

The urine usually contained no protein, but sometimes a trace (up to 0·025 g. per 100 ml.); the sediment was normal. The blood-urea level was 25·2 mg. per 100 ml., urea-clearance 100%, creatinine-clearance 96 ml. per min., and phenol-sulphonphthalein excretion 80% in two hours. The daily amount of urine was 2500–5000 ml., pH 6·9–7·1, sp. gr. 1·001–1·004, rising to 1·016 after twenty hours without drinking. 'Pituitrin' had no influence on the flow of urine (Hickey and Hare test). The serum-sodium level was 148 m.eq. per litre, serum-potassium 1·7–2·5 m.eq. per litre, serum-chloride 100·3 m.eq. per litre, serum-calcium 9·9 mg. per 100 ml., serum-phosphorus 4·86 mg. per 100 ml., serum-alkaline phosphatase 15 King-Armstrong units, and serum-cholesterol 175 mg. per 100 ml. Alkali reserve was 54 vol. %, pH 7·44, pCO_2 35·2 mm Hg. The arterial oxygen saturation was 98·5%. The fasting blood-sugar level was 111 mg. per 100 ml., and after loading with 50 g. of glucose the level after 30 minutes was 150 mg. per 100 ml., after an hour 160 mg. per 100 ml., after $1^1/_2$ hours 154 mg. per 100 ml., after 2 hours 154 mg. per 100 ml., and after $2^1/_2$ hours 120 mg. per 100 ml. The injection of corticotrophin 25 mg. reduced the number of the eosinophil cells from 142 to 29 per c.mm. The basal metabolic rate was +20%, Hb 90%, red-cell count 4,800,000 per c.mm., white-cell count 8000 per c.mm. (eosinophils 2%, basophils 1%, stab cells 2%, neutrophils 51%, lymphocytes 41%, monocytes 3%). The urinary excretion of 17-ketosteroids (11·5 mg. in 24 hours), 17-hydroxy-corticoids (3·8 mg. in 24 hours), and pregnandiol (2·7 mg. in 24 hours) was normal. The urinary excretion of aldosterone was 34 µg. in 24 hours (normal 0·5–8·0 µg. in 24 hours). The acid ketonic steroids were 0·8 mg. in 24 hours, which is not too high (Zimmermann and Wennemann 1955). This fact does not support the conception that the acid ketonic steroids are concerned in the metabolism of aldosterone.

Fig. 1—The patient.

Diagnosis

The clinical picture of polyuria, polydipsia, hypertension, disturbed renal concentration power, with normal urea-clearance and phenol-sulphonphthalein excretion, and the surprisingly low blood-potassium level, suggested Conn's syndrome—i.e., the overproduction of aldosterone, which was also shown by the increased urinary excretion of aldosterone.

Pyelography

We looked for an adrenal tumour, such as has always been found in the cases of aldosteronism so far published. The intravenous pyelograms were normal. The contours of the kidneys and adrenal glands were visible after presacral insufflation of air. The left adrenal gland seemed the larger, but no tumour was discernible. The patient was referred to the surgical department for operation, even though we were of the opinion that in view of the long duration of the manifestations and the absence of a clear indication of a tumour on radiography, this case might be one of adrenal hyperplasia.

Operation

At operation on Jan. 3 Prof. L. D. Eerland did not find a tumour. At our request the whole of the right adrenal gland and about nine-tenths of the left were resected.

Pathology

The right adrenal gland weighed 7·9 g., and the resected part of the left gland 8 g. These weights were definitely too high for this infantile boy aged 17. From findings in patients with Cushing's syndrome Sprague et al. (1953) consider that the normal weight of an adult's adrenal gland is about 6 g.;

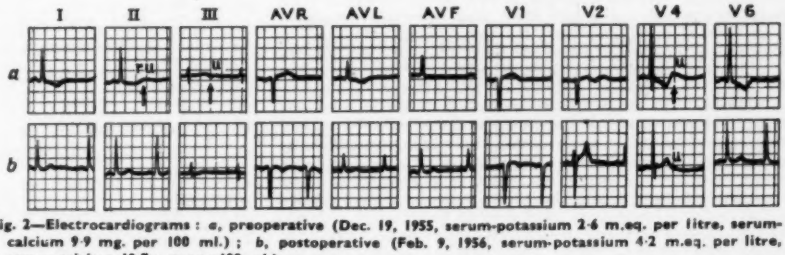

Fig. 2—Electrocardiograms: *a*, preoperative (Dec. 19, 1955, serum-potassium 2·6 m.eq. per litre, serum-calcium 9·9 mg. per 100 ml.); *b*, postoperative (Feb. 9, 1956, serum-potassium 4·2 m.eq. per litre, serum-calcium 10·7 mg. per 100 ml.).

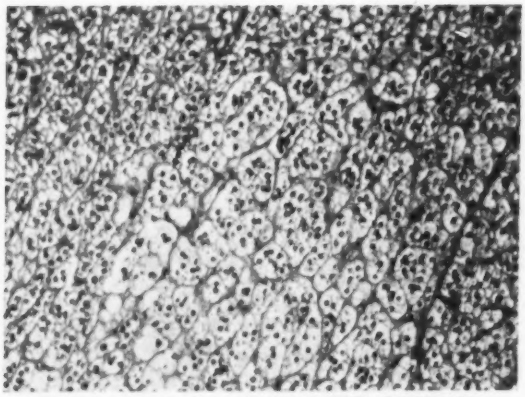

Fig. 3—Hyperplasia of zona fasciculata of left adrenal cortex.

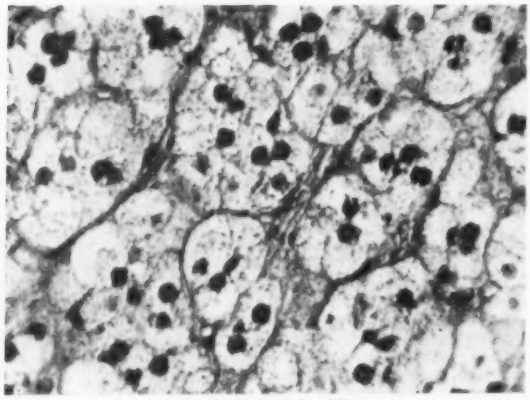

Fig. 4—As fig. 3 (× 420).

and according to Rogers and Williams (1947) the average weight is 4·5. The left adrenal cortex was 3–4 mm. thick, and that of the right 2 mm. These values are also too high in view of the findings of Cope and Raker (1955) in Cushing's syndrome with adrenocortical hyperplasia (normally less than 2 mm.). Microscopy (Dr. A. Arends) showed that the cortex of the left adrenal gland was very hyperplastic, especially the zona fasciculata. The typical trabecular structure of the zona fasciculata was no longer visible, and in some places the zona glomerulosa was hyperplastic (figs. 3 and 4). In some parts of the right adrenal cortex the zona fasciculata was just as hyperplastic as the left adrenal, but at other sites the trabecular structure had been preserved (fig. 5). Here and there the zona glomerulosa of the right adrenal was also hyperplastic, with tubular structure. The zona reticularis of both adrenals was normal. The aldosterone content of the adrenals was 0·25 μg. per g.

Postoperative Course

The patient quickly recovered after the operation. His blood-pressure became normal (130–140/80 mm. Hg) in a few weeks (fig. 6). His serum-potassium level rose to normal values (about 4·5 m.eq. per litre) and serum-sodium level fell to 132–137 m.eq. per litre. His thirst disappeared and he excreted 1·4–1·7 litres of urine per 24 hours. Two weeks after the operation the maximal specific gravity of his urine was 1·017, and the specific gravity of the 24-hour urine was 1·008–1·014. The daily urinary excretion of aldosterone was 10·4 μg. During the first four postoperative days the patient was given cortisone in doses gradually decreasing from 250 mg. to 100 mg., but nevertheless there was a striking excretion of sodium with only a slight excretion of potassium (fig. 6). Since, after a few weeks, the blood-potassium level tended to rise and the blood-urea level rose to 61 mg. per 100 ml., the daily dose of cortisone, which had been reduced to 12·5 mg. was increased again to 25 mg. Thereafter the serum-potassium

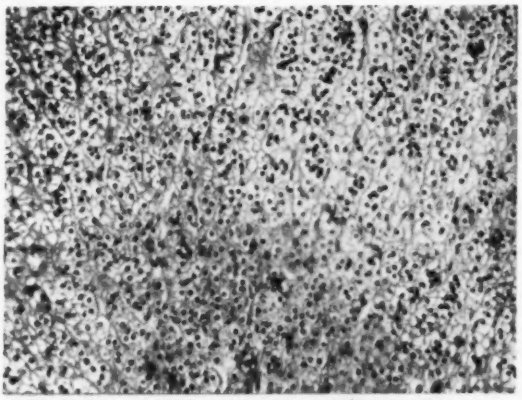

Fig. 5—Hyperplasia of zona fasciculata of right adrenal cortex.

level was 4·2 m.eq. per litre, the serum-sodium level 137 m.eq. per litre, the blood-urea level 45 mg. per 100 ml., pH 7·34, and alkali reserve 34 vol. %. The pH of the urine was 4·6–5·2 (see table). A week after the operation the optic discs had become less cloudy, the cardiac murmurs had disappeared, and the electrocardiogram had become practically normal.

Discussion

The preoperative electrocardiograms support the explanation given by Surawicz and Lepeschkin (1953) for the electrocardiogram in hypopotassæmia in particular the absence of a prolonged QT interval. The electrocardiograms in the present case also showed that this was only seemingly so, owing to the fusion of the T and U waves (fig. 2). It was a remarkable feature that two weeks later there were again flat, just negative, T waves (I, AVL, V_6). During the following weeks the electrocardiogram remained very unstable, probably as a manifestation of changes in the intracellular electrolyte composition, because the serum-electrolytes showed only slight variations in that period. Five weeks postoperatively the electrocardiogram was normal.

The intracellular electrolyte content of the muscular tissue was determined by Dr. K. Panman. The biopsy specimen had been taken at the beginning of the operation, before the patient had been given cortisone. The potassium content was much decreased (67·5 m.eq. per kg. of fresh muscle) and the sodium content too high (52·4 m.eq.

PRIMARY ALDOSTERONISM

—	Preoperative	Postoperative
Blood-pressure (mm. Hg) ..	195/125–220/150	130–140/80
Serum-potassium level (m.eq. per litre)	1·7–2·8	4·2–4·5
Serum-sodium level (m.eq. per litre)	143–150	137
Serum-chloride level (m.eq. per litre)	100	107
Serum-calcium level (mg. per 100 ml.)	9·9	10·7
Blood-sugar level (mg. per 100 ml.)	111	100
Alkali reserve (vol. %) ..	54	36
Blood pH	7·44–7·50	7·34
Urea-clearance (%)	116	..
Blood-urea level (mg. per 100 ml.)	..	45
Excretion of phenolsulphonphthalein (%)	80	60
Volume of urine (ml. per 24 hr.)	2500–5000	1400–1700
Urinary protein	Trace	Nil
Specific gravity of urine ..	1·004–1·016	1·008–1·017
Urine pH	6·9–7·1	4·6–5·2
Urinary aldosterone (γ per 24 hr.)	34·0	10·4
Urinary 17-ketosteroids (mg. per 24 hr.)	11·5	2·6
Urinary hydrocortisone (mg. per 24 hr.)	3·8	4·2
Urinary gonadotropin (units)	7·0	..
Potassium in muscle (m.eq.) ..	67·5 (normal 91–107)	..
Sodium in muscle (m.eq.) ..	52·4 (normal 26–36)	..

per kg.). The potassium and sodium contents of muscle in healthy people were 91–107 m.eq. per kg. and 26–36 m.eq. per kg. respectively. These findings are consistent with those of Westerink et al. (1955) in rats after depletion of potassium.

It may be inferred from this that our patient had primary aldosteronism with hyperplasia of the adrenal cortex, especially the zona fasciculata but also the zona glomerulosa. This makes it probable that both the zona fasciculata and the zona glomerulosa are concerned in the production of aldosterone. Just as the adrenogenital syndrome and Cushing's syndrome may be caused by both hyperplasia and a tumour of the adrenal cortex, so may Conn's syndrome. The clinical picture in the present case differed from that of the cases due to adenoma in that more aldosterone was excreted and muscular weakness or paralysis was absent, although before operation the muscles had shown a clearly myasthenic reaction on faradic stimulation; this reaction became less after the operation but could still be detected. Preoperatively the muscular contractions stopped after 30–50 impulses, whereas $3^1/_2$ weeks after the operation they stopped after 65–85 impulses (Dr. H. K. G. Bartstra). There was no alkalosis; nor was there in the case described by Chalmers et al. (1956). Only occasionally was any sign of tetany found in our patient; tetany was more evident in the tumour patients.

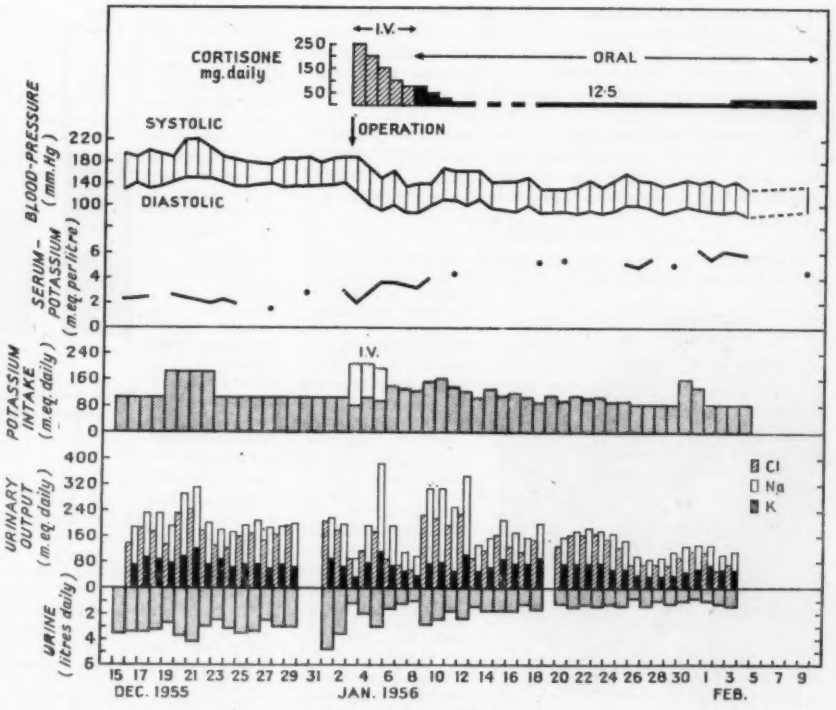

Fig. 6—Progress chart.

The therapeutic results so far obtained in our patient show that subtotal adrenalectomy is the therapy of choice in such cases. Systematic investigation of the features of the syndrome proved that these were largely results of potassium deficiency.

Summary

A patient with Conn's syndrome is described. The cause was hyperplasia of the adrenal cortex. Most of the signs and symptoms were like those in previously published cases in which either an adenoma or a carcinoma of the adrenal cortex had always been found.

It was remarkable that our patient had no muscular paralysis or weakness but only a myasthenic reaction. He showed only slight indications of tetany. The urinary aldosterone excretion was greater than in comparable cases with an adenoma of the adrenal cortex.

Electrocardiography did not show a prolonged QT interval but showed a high U wave which looked like a prolongation of QT.

The patient recovered after subtotal resection of the adrenal cortex, and was maintained with cortisone 25 mg. daily.

We wish to thank Dr. L. G. Huis in't Veld for investigating the 17-ketosteroids and acid ketonic steroids; and Dr. A. Wettstein, of Basle, for determining aldosterone in the urine and in the adrenal glands.

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UNINTENTIONAL GASTRO-ILEOSTOMY AFTER PARTIAL GASTRECTOMY

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UNINTENTIONAL gastro-ileostomy after partial gastrectomy has rarely been reported. Moretz (1949) found three such cases and added a fourth; and four have been described by Fleming and Ward-McQuaid (1950), Barritt (1952), Landry (1951), and McKenzie and Robertson (1953). Gastro-ileostomy in place of gastrojejunostomy is more common and less disastrous. Such cases do better because there is continued passage of a portion of the gastric contents through the pylorus, with consequent absorption. This has been shown by barium studies (Brown et al. 1947). Such types of gastro-ileostomy are not discussed here.

The clinical picture of unintentional gastro-ileostomy after partial gastrectomy is well described by Moretz (1949), in whose patient the operation was made difficult

by "congenital malrotation of the gut." Moretz described the surgical measures necessary to avoid the error. Barritt (1952) emphasises the differential diagnosis from diarrhœa due to other causes. Cooley and Hartmann (1951) discuss the medical management of such severely malnourished patients.

The present case is similar to that described by Moretz (1949) in that the anastomosis had been made difficult by congenital malrotation of the gut. The gastro-ileostomy was fatal within two years of the gastrectomy.

Case-report

A company secretary, aged 44 and weighing 13 st., first reported to his doctor in July, 1951. He had enjoyed good health until four weeks previously, when he first noticed pain coming on an hour after food and relieved by alkali. He lost weight during the next six months, and at the end of that time a barium meal showed pyloric stenosis. This was considered to be due to duodenal ulceration, and partial gastrectomy was done in January, 1952, when he weighed 10 st. (140 lb.).

Fig. 1—Instillation of thin barium through Miller-Abbott tube: note short length of tube between stomach and cæcum, and barium in voluminous transverse colon and splenic flexure.

The findings at operation included fibrosis of the pylorus and the first part of the duodenum and incomplete rotation of the intestines, the cæcum and appendix lying in the midline and most of the small intestine on the right side. A Polya gastrectomy, with Hofmeister valve and an isoperistaltic antecolic anastomosis, was done with some difficulty, the first part of the jejunum having to be brought round the hepatic flexure.

Two weeks after the operation the patient began to pass painlessly foul yellow watery stools from three to five times daily and experienced increasing hunger and thirst. He returned to work but continued to lose weight and developed an enormous appetite, debility, and lassitude. His weight had fallen to 7 st. by December, 1952, when he was readmitted to hospital ten months after gastrectomy. A barium meal showed a normally functioning stoma, and a barium enema showed a voluminous large bowel with no evidence of gastrocolic fistula. He was treated with a high-protein and wheat-gluten-free diet, vitamin supplements, and intravenous infusions of blood and proteins but did not improve. He was transferred to the Postgraduate Medical School of London on July 25, 1953, eighteen months after gastrectomy.

Examination

The patient was emaciated (5 st. 12 lb.) but cheerful and coöperative. He was mentally and physically debilitated and could not sit up without help. He had a drawn face, angular stomatitis, a pale smooth tongue, dry and scaly skin, and œdema of feet and ankles. His chest was clear, and his cardiovascular system showed no gross abnormality, but his blood-pressure was 70/50 mm. Hg, and his deep reflexes were sluggish. His abdomen was scaphoid but not tender and showed a paramedian scar. Rectal examination was negative.

Diagnosis

Mr. M. R. Ewing suggested, on clinical grounds, that there was a gastro-ileal anastomosis, and this was found on radiography.

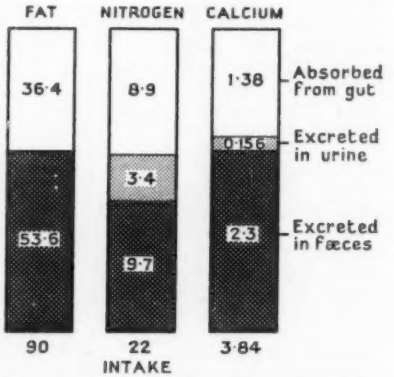

Fig. 2—Four-day balance of fat, nitrogen, and calcium, showing intake, absorption, and excretion in g. per 24 hr.

Investigations

Examination of the blood showed Hb 12·3 g. per 100 ml., red cells 3,800,000 per c.mm., packed-cell volume 39%, mean corpuscular volume 103 c.μ, mean corpuscular Hb concentration 31·5%, and white cells 6000 per c.mm. (differential count normal), plasma-sodium 140 m.eq. per litre, plasma-potassium 4·5 m.eq. per litre, plasma-calcium 8·5 mg. per 100 ml., plasma-chloride 109 m.eq per litre, plasma-phosphate 2·2 mg. per 100 ml., serum-proteins 4·0 g. per 100 ml. (albumin 1·5 g. per 100 ml., globulin 2·5 g. per 100 ml. with peaks in β and γ). A biopsy specimen of bone-marrow appeared normal.

The fæces were liquid, foul, and light yellow, and contained many microscopic undigested muscle-fibres. Nothing abnormal was detected in the urine.

A small-bowel-barium enema given through a Miller-Abbott tube (fig. 1) showed a small-bowel pattern at 24 inches from the mouth and a large-bowel pattern at 42 inches from the mouth. A four-day balance of fat, nitrogen, and calcium (fig. 2) gave the following results:

Of 90 g. of fat consumed per twenty-four hours 59·5% was lost in the fæces.

Of 22 g. of nitrogen consumed per twenty-four hours 44·1% was lost in the fæces and 15·5% in the urine.

Of 3·84 g. of calcium consumed per twenty-four hours 59·9% was lost in the fæces and 4·1% in the urine.

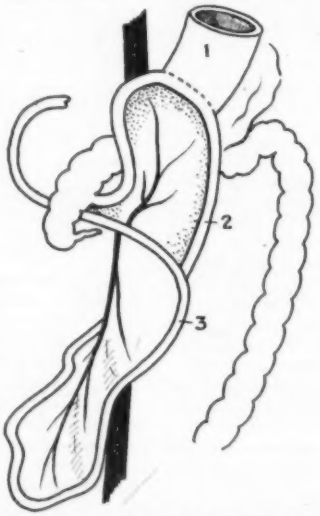

Fig. 3—Gastro-ileostomy found at jejunostomy: 1, gastric stump anastomosed to 2, lower ileum, and bypassing 3, small intestine.

Fig. 4—Malrotation of intestines (Dott 1924): A, small intestine passing in reversed rotation anterior to superior mesenteric artery; B, cæcum held in forward position in centre of abdomen.

Treatment and Progress

The patient received a fortified milk-'Casilan' drip-feed through an intragastric tube. After initial improvement his stools became more copious and frequent. On Aug. 6, 1953, he became euphoric and disoriented and later lost consciousness. Peripheral failure ensued. His serum-sodium level was then 128 m.eq. per litre and serum-bicarbonate level 11·5 m.eq. per litre. He was successfully treated with intravenous sodium lactate. On Aug. 11 he was irritable and very weak; his serum-potassium level was 1·8 m.eq. per litre, and later the same day 0·7 m.eq. per litre. Electrocardiography confirmed the presence of hypokalæmia. A subcutaneous infusion of potassium citrate was given, and transient tetany was noticed as the hypokalæmia was corrected. On Aug. 12 his general condition was much improved, he was fully conscious, and his serum-electrolyte levels were normal.

Operation and Postoperative Course

Jejunostomy under thiopentone and nitrous-oxide anæsthesia was done that evening by Mr. Ewing and a gastro-ileal anastomosis was found (fig. 3).

Postoperatively the patient passed through a phase of severe shock followed by pneumonia, but gradual recovery then began. Parenteral fluids (blood, dextran, and 5% dextrose) were continued until the sixth day after operation. Jejunostomy feedings with fortified milk mixture were begun on the second day after operation. Although the serum-electrolyte levels remained within normal limits, the peripheral œdema became more prominent. On the seventh day the patient suddenly collapsed and died after using a bedpan.

Necropsy Findings

The body was emaciated, with œdematous connective tissue and 600 ml. of fluid in the peritoneal cavity (no blood-clot) and 900 ml. of fluid in each pleural cavity. The myocardium was brown and flabby; on section it showed fatty degeneration only (no necrosis). The coronary arteries were normal. The trachea and bronchi contained watery fluid. The lungs showed collapse of the right lobe and œdema in the left lower lobe but no inflammation. The œsophagus was normal. There was malrotation of the gut (fig. 4), the transverse colon lying behind the small intestine. The cæcum and shortened ascending colon were provided with a mesentery and lay in a forward position in the centre of the abdomen. The gastric stump had been anastomosed to the ileum about eighteen inches above the ileocæcal junction. The superior mesenteric artery passed behind the third part of the duodenum instead of in front of it. The small intestine was attached to a single pedicle instead of to a mesentery of normal length. The liver and pancreas were normal. The kidneys showed gross vacuoles and pyknosis of nuclei in the cells of the proximal tubules—changes characteristic of chronic potassium deficiency (Keye 1952). The suprarenal glands showed narrowing of the cortex and depletion of lipoid. Severe osteoporosis was found but no osteomalacia. Some hypoplasia of normo-erythroblastic bone-marrow was present. The pituitary gland had no α-cells and had two small zones of necrosis in the anterior lobe.

Discussion

This is the second recorded case of faulty anastomosis associated with abnormal rotation of the gut. Of the first case Moretz (1949) wrote: "The duodenum does not cross over the abdomen . . . but continues downward on the right side to the jejunum, and most of the large bowel is located in the left half of the abdomen." Apparently that case was one of "non-rotation" of the gut as defined by Dott (1924). The malrotation in the present case was also described by Dott (fig. 4). The difficulties found in unravelling the anatomical arrangement at jejunostomy, and even post mortem, illustrate the difficulty which must have been experienced at the original operation.

Gastro-ileostomy is a disaster in the technique of gastrectomy. Gross weight-loss and severe diarrhœa are characteristic. Outstanding in the clinical picture is rapid weight-loss despite a voracious appetite. In cases after gastrectomy a loss of 5–7 st. in three to twelve months is usual. This is due to depletion of fat and protein caused by inadequate absorption by the gut. Gross muscle-wasting, hypoproteinæmia, and hunger œdema were present in all the reported cases. Avitaminoses may be striking. Osteomalacia "due to vitamin D deficiency" was a dominant feature in the case described by Cooley and Hartmann (1951), where the period after operation and before treatment was protracted (six years). In the present case the absorption of calcium, the electrolyte levels, and the bone sections showed that osteoporosis was present without osteomalacia. Perhaps supplementary injections, including vitamin D and/or reserve stores of vitamin precursors, helped to maintain bone function and aided the absorption of calcium. Deficiencies of vitamin B and vitamin C have also been reported. Anæmia is mild or moderate and normo-erythroblastic. No megaloblastic anæmia secondary to gastro-ileostomy has yet been reported.

Together with such evidence of malnutrition the other main clinical feature is the characteristic diarrhœa. This was severe in all the reported cases. In some cases the bouts of diarrhœa were accompanied by vomiting, whereas in others, including the present case, the diarrhœa was continuous, painless, and associated with a voracious appetite. In the more fully reported cases and in the present case the diarrhœa began when a solid diet was given again three to fourteen days after gastrectomy. In patients with previously normal bowel habits this should be taken as pathognomonic of, or at least be suspected immediately to be evidence of, gastro-ileostomy and therefore be investigated. In the previously reported cases the intervals between the gastrectomy and the established diagnosis were six months (McKenzie and Robertson 1953, Smith and Rivers 1943), one and a half years (Moretz 1949), two years (Fleming and Ward-McQuaid 1950), and six years (Cooley and Hartmann 1951).

A key to diagnosis is Miller-Abbott intubation of the ileum, with instillation of thin barium and screening. The appearance of the bowel pattern can then be followed carefully and clearly as the barium passes into the cæcum. The value of this procedure is emphasised by Cooley and Hartmann (1951). The follow-through of a barium meal may be sufficient but can be inconclusive. Prolonged alimentary studies are exhausting to such severely debilitated patients, and intubation allows a confident radiological diagnosis to be made quickly and accurately.

Gross electrolyte and acid-base imbalances may occur in episodes, and chronic deficiencies are common. Thus in our patient a bout of increased diarrhœa was followed by acidosis and evident deficiency of sodium and potassium, which were probably acute-on-chronic in type. At one stage imminent death from hypokalæmia was averted only by the infusion of potassium citrate. The necropsy finding of vacuolisation of the proximal tubular cells of the kidneys with nuclear pyknosis and without arterial or glomerular disease is characteristic of chronic potassium deficiency (Keye 1952). The histological appearance of our patient's kidneys was used by Milne (1955) to illustrate chronic potassium deficiency. Such an appearance ("clear-cell nephrosis") can be found in Addison's disease treated for a long time with deoxycortone, in steatorrhœa and other long-standing intestinal disorders, in potassium-losing nephritis, and in primary aldosteronism, in which occur intermittent muscular weakness and tetany, muscle pains and spasms, and hypokalæmia, and an adrenal tumour containing large amounts of aldosterone is found (Conn 1955). In these conditions chronic potassium deficiency may be latent or responsible for clinical features, or even lethal. Myocardial infiltration by polymorphs and cellular necrosis are often present in these cases but were not found in our patient.

The factors contributing to our patient's death were: (1) the hypoproteinæmia and gross debility, (2) the electrolyte imbalance, and (3) the infusions necessary to correct these disturbances and causing overhydration. It is certainly impossible to improve or even to maintain

the nutrition of these patients by oral measures alone. Surgery must be early to be life-saving. The preliminary supervision of electrolyte status and preoperative nourishment is essential. Jejunostomy is the operation of choice as a preliminary to later reconstructive surgery since, after it, there is rapid improvement in nutritional status.

The original error in this case was pardonable because of the malrotation. The present case emphasises the importance of checking, at gastrectomy, that the surgeon is in fact using a jejunal loop for the anastomosis. Moretz (1949) dealt thoroughly with these considerations. Even more important for these unfortunate patients will be the recognition by surgeons in the postoperative period, when symptoms first begin, that a mistake may have been made in a difficult operation. Then, while the patient is still fit, investigations and a second operation will be life-saving.

We wish to thank Mr. M. R. Ewing for help in the preparation of this article, and Prof. J. H. Dible for the necropsy findings.

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IDIOSYNCRASY TO FRUCTOSE

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THIS report of a patient who complained of vomiting after taking sugar is made in view of recent interest in inborn errors of carbohydrate metabolism.

TABLE I—EFFECT OF TEST SUBSTANCES

Day	Substance and amount given	Fructose content of added substance (g.)	Effect
1	Glucose 20 g. ..	0	None
2	Sucrose 20 g. ..	10	Nausea
3	Lactose 20 g. ..	0	None
4	Fructose 20 g. ..	20	Nausea
5	Saccharin gr. 0·8	0	None
6	Galactose 20 g. ..	0	None
8	Sucrose 20 g. + saccharin gr. 0·4	10	None
9	Lactose 20 g. + saccharin gr. 0·4	0	None
10	Galactose 20 g. + saccharin gr. 0·4	0	None
11	Fructose 50 g. ..	50	¼ hr.: brief subxiphoid pain 1¼ hr.: felt hot and cold; gradual onset of nausea 2¼–8 hr.: vomited seven times, leaving her weak and nauseated
12	Saccharin gr. 0·4	0	None
13	Sucrose 20 g. ..	10	Nausea
14	Lactose 20 g. ..	0	None
17	Galactose 20 g. ..	0	None
18	Sucrose 50 g. ..	25	Nausea, vomited once
19	Glucose 50 g. ..	0	None
21	Galactose 50 g. ..	0	None
22	Fructose 25 g. ..	25	Nausea, vomited once
25	Sucrose 30 g. ..	15	Nausea

TABLE II—URINARY EXCRETION OF SUGAR

Substance given and amount	Urine collection	Urinary fructose (mg. per 100 ml.)
Glucose 50 g.	0–6 hr.	0
Galactose 50 g.	0–6 hr.	0
Sucrose 30 g.	1–2 hr.	7
Sucrose 50 g.	0–6 hr.	250

A spinster, aged 24, was admitted on Aug. 31, 1953, by Dr. Denis Williams to the National Hospital for investigation. She complained, apart from minor phobic symptoms, of vomiting after taking fruit or sugar. She said that her sugar intolerance was limited to cane-sugar and that she could take glucose without ill effects although she did not enjoy the taste. Symptoms had appeared first at the age of 10 months on weaning; she had then been admitted to hospital and the intolerance confirmed.

Investigation.—The patient was given various sweetened drinks: the effects of these are given in table I, from which it will be seen that no ill effects followed unless fructose or sucrose (yielding fructose and glucose on digestion) was given; that nausea resulted on two of the three occasions when she took an effective dose of 10 g. of fructose; and that larger amounts of fructose led to increasingly severe effects. Symptoms usually began 1¾ hours after ingestion of the sugar and lasted up to 8 hours. A glucose-tolerance test was normal. Blood-fructose levels after ingestion of 50 g. of fructose were: fasting, 4·3 mg. per 100 ml., ½ hour, 13·0 mg. per 100 ml., 1 hour, 17·0 mg. per 100 ml., and 2 hours, 10·5 mg. per 100 ml. These figures are just above the normal range (Herbert 1939). Fructose appeared in the urine (semiquantitative estimation by paper chromatography) only after sucrose or fructose had been taken (table II).

The patient was the only child of unrelated parents who developed neither symptoms nor fructosuria after taking 50 g. of fructose.

This condition differs from benign fructosuria, in which the excretion of a proportion of ingested fructose is not accompanied by the symptoms of intolerance displayed by this patient, which were presumably caused by the accumulation of a toxic intermediate. Since there is no disturbance of her glucose metabolism, the biochemical lesion is probably situated before the formation of fructose-6-phosphate, which is the point where the metabolism of glucose and that of fructose reach a common path.

The practical importance of this observation is that idiosyncrasy to fructose should be considered as one cause of difficulty in weaning.

We wish to thank Dr. Denis Williams, who admitted the patient under his care for investigation; Dr. J. N. Cumings and Mr. R. C. Shortman for the tolerance tests; Dr. L. S. Woolf and Dr. R. H. Wilkinson for the chromatographic estimation of fructose in the urine; and the medical committee of the National Hospital for permission to publish.

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". . . An inner critique has provided self-correcting and adjusting forces in the graphic arts, drama, and music. Politics has its correctives, be they election or revolution. But medicine has never had an effective forum for critique within, and only at times fair criticism from outside. Since the conserving arts of medicine, though essential, tend to hold back progress if not examined and refreshed by the experiment and experience of practice, and since the essential characteristic of science is that it is provisional, forever being finished but never finished, change is the life blood of medicine. But change, unless directed, rarely correlates with progress. The crucial and painful defect of present-day medical practice is the lack of effective critical introspection. A deficiency of the catalytic enzyme, criticism, can be harmful, can produce as much morbidity and mortality in medical practice, teaching, and research as a vitamin deficiency can produce in a growing, living creature."—Dr. WILLIAM B. BEAN. *Arch. intern. Med.* 1956, **97**, 497.

New Inventions

GRAVITY-OPERATED PUMP FOR TUBE FEEDING

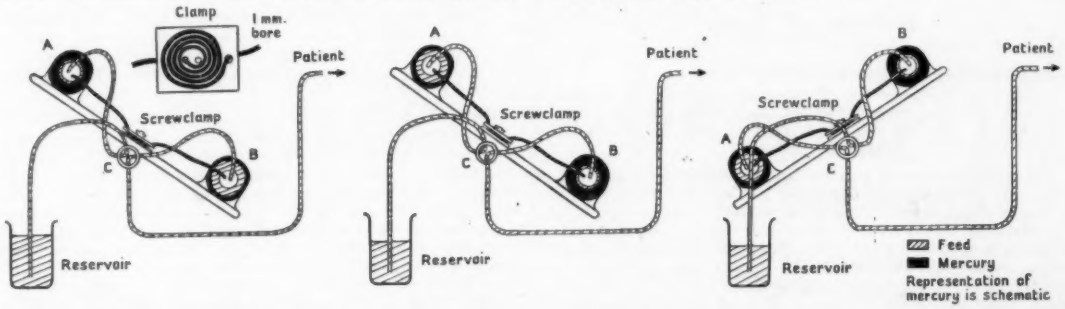
THE conventional gravity drip apparatus for continuous tube feeding has two disadvantages: first, a thick feed may "sludge" behind the regulating clip; and second, controlling a slow rate of flow is often difficult. Both these factors may prevent the administration of the correct daily volume of feed; and uneven administration is a common cause of colic and diarrhœa, particularly in jejunal feeding.

To meet these objections many types of expensive and complex forced-feed pumps have been devised.[1 2] After much experience of pumping jejunal feeds containing gastric and duodenal aspirate, a simple gravity-operated apparatus has been designed which not only has the minimum of moving parts but also does not require a regulating clip or valve in the delivery system.

The pump (see figure) consists of two vessels, A and B, containing a total of 250 ml. mercury, mounted on a platform which is pivoted at its midpoint. By inclining the plane, the mercury can be made to run from one vessel to the other at a rate determined by the pressure of a brass plate on a spiral of fine rubber tubing. Latex rubber balloons within A and B contain the feed. The arrangement of the valve C is such that if A is filled with mercury, and the balloon in B with a suitable feed, the flow of mercury into B will displace the feed at a constant rate into the patient; at the same time the balloon in A will be filled by the feed from the reservoir.

When all the mercury has passed from A into B, the pressure in B will fall to approximately that of the atmosphere; the balloon in A is then full of feed and the vessel B with mercury. If the platform and the valve C are now rotated anticlockwise through 90°, A will refill with mercury, displacing the feed from the reservoir. The complete cycle, which is illustrated, can be repeated as often as required. At a feed rate of 1 ml. per minute the platform is tipped every 4 hours.

If a balloon should tear, mercury cannot reach the patient because the outlet tube is carried above the level of the upper container.



Contamination of the feed by mercury passing across the balloon has not occurred after periods of exposure of up to 11 hours.

To control the rate of rotation of the platform, and thus to prevent damage to the vessels A and B, a modified piston from a Potter-Buckey X-ray screen is mounted between the platform and the base so that the assembly can be tipped only slowly.

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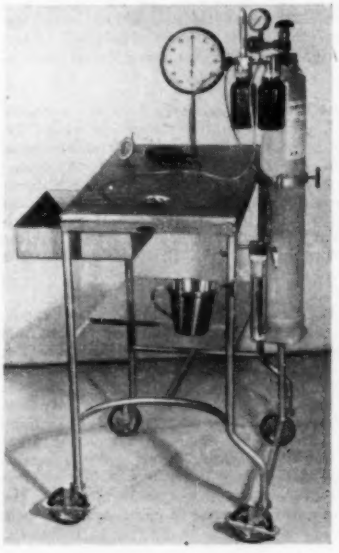
1. Snyder, C. C. *Plast. reconstr. Surg.* 1951, **8**, 73.
2. Fallis, L. S., Barron, J. *Bull. int. Chir.* 1956, **15**, 9.

A RESUSCITATION TABLE FOR THE NEWBORN

RESUSCITATION of the newborn after anæsthesia for labour or cæsarean section is becoming more and more the responsibility of the anæsthetist. If this delicate procedure is to be carried out efficiently, the tiny patient must be in the correct position, at the right height for the operator, and with the head fixed so that suction and manual ventilation can be quickly and atraumatically applied. Many tables and pieces of apparatus have been designed for this purpose, but most have disadvantages.



The table illustrated here (see figure) is of a convenient height for general use with the anæsthetist standing; it is equally satisfactory for laryngoscopy when he is sitting before it. Laryngoscopy is facilitated by fixing the baby's head in the hole in the mattress—a most important factor since an anoxic child is always well relaxed and, owing to the presence of amniotic fluid, very slippery. The hole is oval and measures 11 × 9 cm. Fixation by this method is good enough to prevent a healthy baby from rolling off the table even when struggling and kicking.

The top of the table is covered by a 5 cm. thick mattress made of sponge nylon, in which the hole for the child's head is cut. It is also fixed in a 10° Trendelenburg slope, which can be altered, but for most cases 10° is satisfactory, provided efficient suction is available.

The table is equipped with an oxygen cylinder which has both a suction unit and a flowmeter attached. The suction is effective for both pharyngeal and tracheal work, and the flowmeter is connected to a bag and mask of a special light-weight type designed for babies.[1] The tube from the flowmeter to the bag incorporates a safety device in the form of a blow-off valve or water-seal set at a pressure of 15–20 cm. of water. This prevents any excessive pressure from reaching the baby when artificial respiration is being applied with the bag and mask.

A clock on the table enables an accurate check to be made of the time which passes before normal respiration starts, and draws attention to the need to avoid delay in suction from the bronchial tree or in ventilation.

Other equipment includes a water jug for clearing the suction catheter and a drawer beneath the table

1. Secher, O., Nyrop, M. *Anesthesiology*, 1955, **16**, 808

for storing laryngoscope, tubes, and other equipment. The table is 102 cm. high (including the mattress), 70 cm. long, and 50 cm. wide—and it is fitted with wheels, two of which have brakes. These dimensions are adequate for even the largest baby.

Heating is not incorporated nor has it been found necessary. A baby will not be harmed by being a little cold for a short time, and deliberately keeping an anoxic child cold will cut down its oxygen consumption until normal respiration can be established. Warming the child, on the other hand, will limit the time available for resuscitation.

This table has been used in our department for more than a year and has been found very satisfactory.

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Reviews of Books

Complications of Regional Anæsthesia

Signs and Symptoms—Treatment. DANIEL C. MOORE, M.D., director, department of anesthesiology, Mason Clinic, Seattle, Washington. Oxford: Blackwell Scientific Publications. 1956. Pp. 291. 75*s*.

CHAMPIONS of both general and local anæsthesia sometimes show remarkable bigotry. Not so Dr. Moore, who as a well-known exponent of local techniques has provided us with an uncommonly valuable volume on the complications of these methods. Many of these sequelæ are often conveniently forgotten or perhaps never even appreciated by the doctor; yet, as Dr. Moore points out, they may be catastrophic. Moreover their practical significance is not restricted to the relatively few which terminate in death or permanent damage. It is the less ominous but commoner complications which often militate against the choice of a particular type of local analgesia.

This work is not a condemnation of local analgesia, which in fact is no more dangerous than general anæsthesia provided it is competently administered. It is a work of reference based on an extensive survey of the world literature and incorporating with admirable lack of bias the experience of Dr. Moore and his colleagues.

Trace Elements in Human and Animal Nutrition

E. J. UNDERWOOD, Institute of Agriculture, University of Western Australia. New York: Academic Press. London: Academic Books. 1956. Pp. 430. 76*s*.

"THE Lord God formed man of the dust of the ground." Whatever credence is given to the *Genesis* story, there is no doubt that man and all his domestic animals are compounded from dust, vegetable material being an intermediate stage in the process. Yet the biological rôle of the elements in this dust have been little studied. This is indeed the first full-scale monograph on the subject.

Six of the elements considered—Fe, Cu, Mn, Zn, I, and Co—have been conclusively shown to be essential for the higher forms of animal life, though their biological rôles are not fully understood. Others, such as Mo, Ni, F, Al, Se, As, Ba, Sr, B, Br, and Si, are constantly present in the tissues and body-fluids of the higher animals, but whether they are essential for any biological process has not been established with certainty. Dr. Underwood has put together what is known about the biology of these elements in a workmanlike manner.

On the practical side, diseases arising from primary deficiency of these elements are much more important in animals, especially those that graze on pastures grown on one type of soil, than in man, who nowadays usually draws his food from widely different geological sources. Iodine deficiency, of course, remains a major disorder of isolated rural communities in many parts of the world, and possibly other deficiency states in isolated regions remain unrecognised. It is less than twenty years since the syndrome of fluorine intoxication in man was first recognised in an Indian village.

Dr. Underwood has many fascinating stories to tell, and he tells them well.

Diagnosis and Treatment of Vascular Disorders (Angiology)

Editor: SAUL S. SAMUELS, M.D., editor-in-chief, *Angiology*. Baltimore: Williams & Wilkins. London: Baillière, Tindall, & Cox. 1956. Pp. 621. £6 8*s*.

THIS volume is to be regarded, not as a textbook of peripheral vascular disease, but as a collection of essays. Some of these are obviously designed to be comprehensive source-articles, while many others express the author's personal beliefs rather than current opinion. This method of presentation will be welcomed by those already familiar with the subjects discussed, but it cannot be recommended for the novitiate. The discriminating reader will derive great pleasure from many of the articles, and particularly from Dr. F. A. Simeone's on arterial injuries.

The Blood-Brain Barrier

With Special Regard to the Use of Radioactive Isotopes. LOUIS BAKAY, M.D., F.A.C.S., instructor in surgery, Harvard Medical School. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1956. Pp. 154. 40*s*.

THIS short monograph comprises three main sections. A brief but adequate historical review of the development of ideas on the so-called blood-brain barrier is followed by detailed consideration of recent work on the barrier using isotopic tracer techniques first in normal animals (including man) and secondly in the presence of various abnormal states of the central nervous system. In addition to his numerous animal experiments, Dr. Bakay has, as a neurosurgeon, investigated clinical cases, and his results on the localisation of radioactive phosphate in patients exhibiting vascular and neoplastic changes are particularly illuminating. His predilection for isotopic phosphate as a tracer introduces complicating factors, since the radicle enters so freely into numerous metabolic reactions; but these factors do not affect the validity or practical value of observations confined to the topographical distribution of injected isotope.

The book can be commended as a useful and succinct survey of this important and topical subject.

Health for the American People (Boston: Little, Brown. 1956. Pp. 105. $1).—Last November, to celebrate the centenary of the Massachusetts Memorial Hospitals, a group of experts met to discuss "simply and without passion" some current problems and future needs. One panel considered how health services should be organised, a second how they should be financed, and a third "community action for health." Afterwards there was a general discussion, with Judge Bailey Aldrich as moderator. In this report of the proceedings the trends of American thought on health and medical services are clearly described, together with the various alternatives confronting the American people. It is a useful book for those interested in the organisation of medical care.

Ageing in Transient Tissues (London: J. & A. Churchill. 1956. Pp. 263. 36*s*.).—The second volume of the Ciba Foundation's Colloquia on Ageing reports the proceedings of a meeting held in 1955. As Prof. E. C. Amoroso, the chairman, pointed out in his introductory remarks, the subject "comprehends a great variety of problems," and the papers ranged from the physical instability and ageing of red blood-cells to the metabolism of senescent leaves. The volume appears under the editorship of Dr. G. E. W. Wolstenholme and Miss Elaine Miller.

Medical Bacteriology (6th ed. London: J. & A. Churchill. 1956. Pp. 540. 30*s*.).—The sixth edition of this deservedly popular textbook, by Sir Lionel Whitby and Dr. Martin Hynes, follows the pattern and retains the merits of the fifth edition, which appeared in 1951; but the chapter on arthropod vectors is a welcome addition. The student who knows all that is in this book should satisfy his examiners but it is not quite so certain that reading it will stimulate him to turn to one of the longer works. Perhaps it is inevitable that short and workmanlike texts—of which this is certainly one—should fail to convey something of the philosophy of the subject and the sense of exciting discoveries to come.

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THE LANCET

LONDON: SATURDAY, AUGUST 18, 1956

Prostatectomy at Hospital B

THE prostate is unique because it can be operated on from above or from below, from behind or from in front, with results that are equally gratifying—or equally disastrous. At Hospital A, where operating on octogenarians has become the *pièce de résistance* of the surgical team, the results are brilliant. At Hospital B, just round the corner, the mortality and morbidity are appalling. Take some figures from hospital A. JACOBS,[1] analysing 100 consecutive Millin-type prostatectomies, finds that 78 of the patients were aged seventy or over, 26 had passed their seventy-fifth birthday, and 12 were octogenarians up to eighty-seven. The number of postoperative deaths was 3. Over the same period 27 patients were submitted to perurethral resections, 4 of whom were octogenarians. In this group there was 1 death (from cerebral vascular disease)—an over-all mortality of 3·1%. Similar figures were reported by WELLS[2] from a general surgical department, where a different preoperative routine and operative approach were used; and there were even fewer deaths in large series of perurethral resections only.[3] We lately referred[4] to the equally low morbidity-rate in similar centres. All is thus quite well in Hospital A. But what about Hospital B, whence no statistics emanate? There postoperative death is common, and residual disability is accepted as almost inevitable. Why is there this startling difference?

The average prostatectomy is an easy operation: with so many approaches available and so many technical minutiæ elaborated, the chief difficulty is often an *embarras de richesse*. Theoretically every prostate may demand one particular operation; but in practice any operation, thoroughly mastered, will serve the surgeon well in nearly all his patients. But if prostatectomy is an easy battle, the cure of patients with prostatic disease is an arduous campaign. It is more commonly decided in the ward than in the operating-theatre; for it is in the ward that the surgeon must cope with three potential killers—bleeding and its effects, infection and its sequelæ, and the collapse of the patient's morale. This week we publish two articles dealing with postoperative bleeding. As Mr. DAWSON-EDWARDS remarks, a certain amount of immediate postoperative blood-loss is inevitable after prostatectomy; and certainly such venous oozing rarely kills the patient; yet it is by no means unimportant. Most of the patients who die at Hospital B, die (as the cynic would say) of "nothing in particular"; and this ooze—like mild diabetes, chronic bronchitis, senile myocarditis, and cerebral arteriosclerosis—is one of the nothings. As an addition to such essential safety-measures as the correction of preoperative anæmia, scrupulous hæmostasis, and the immediate replacement of blood-loss, the manœuvre described by Mr. SKYRME REES on p. 331 may well prove a valuable step in reducing this bleeding to a minimum.

Reactionary hæmorrhage, which Mr. DAWSON-EDWARDS defines as "arterial hæmorrhage within the first forty-eight hours of operation," can be a far more dramatic event. That it has not, in his experience, presented any serious difficulties, may well be due to the ligation of the inferior vesical arteries at the bladder neck. Even this, however, does not ensure absolute safety if the blood-pressure is allowed to fall steeply during the operation and is then hurriedly restored by massive transfusions and pressor drugs. Moreover, the blood-supply of the grossly enlarged adenomatous prostate does not always conform to the normal pattern; indeed, even in the normal pelvis, the blood-vessels may follow an erratic course.

Secondary hæmorrhage has become more, not less, common since the introduction of routine chemotherapy and antibiotics[5]; within a matter of hours—even in the absence of frank hæmaturia—it can strike down the patient who appears to be well on the way to recovery. There can be no doubt that the right way to stop it, like any other arterial bleeding, is neither by packing nor by the use of inflatable bags, but by securing the actual bleeding points; but the contention that the only certain way of doing this is "by passing a resectoscope, evacuating the blood-clot, and arresting hæmorrhage by diathermy" must raise misgivings in the minds of those who are inexpert in the use of this instrument. They can hardly accept Mr. DAWSON-EDWARDS'S view without deciding that they had better not operate on the prostate.

Infection, the most common complication in Hospital B, is usually precipitated, and invariably aggravated, by mismanaged bladder drainage. This is one of the most intricate and exacting surgical tasks, and unhappily it is still delegated to inexperienced juniors and nurses. "An acute retention," STEPHEN POWER has lately said,[6] "should be regarded as an emergency of the same order as a perforation or an appendicitis; although the patient may not go to the theatre at once, he certainly needs the services of a surgical registrar in the ward." (The "immediate prostatectomists" *do*, of course, take the patient to the theatre at once; but—though their insistence on scrupulous asepsis has done prostatic surgery an immense service—it now seems unlikely that their routine will be adopted outside a few specially equipped centres.) What is true of acute retention, must surely apply with even greater force to the chronic condition. Every route by which the bladder can be drained—and every one of the many variations on the three major themes—has something to be said for and against it. The suprapubic tube is perhaps the least likely to slip; and, though it does not avoid cystitis, it eliminates urethritis and spread of infection from the posterior urethra. But the drainage is uphill (even if remarkably well maintained by intra-abdominal pressure on the collapsed bladder); the peritoneal cavity is not always out of danger; and a small-bore tube is easily blocked by phosphatic deposits from a heavily infected alkaline urine. The perineal route, which is part of Mr. SKYRME REES'S routine, has dependence in its favour; but, for sheer simplicity,

1. Jacobs, A. *Scot. med. J.* 1956, **1**, 2.
2. Wells, C. Prostatectomy. Edinburgh, 1952.
3. Thompson, G. J. *In* Modern Trends in Urology. London, 1953; chapter 28.
4. *Lancet*, 1956, i, 328.
5. Galbraith, W. W. *In* Modern Trends in Urology. London, 1953; chapter 24.
6. Power, S. *Postgrad. med. J.* 1956, **32**, 369.

a single, gentle, and aseptic urethral catheterisation —as long as it *is* single, gentle, and aseptic—is still the most generally satisfactory method for short periods. Like the choice of operation, the choice of drainage route matters infinitely less in practice than attention to detail with any one method. Urological surgery abounds with picturesque and ominous phrases, and perhaps another should be coined to describe the drop of blood that issues from the external meatus after the house-surgeon has tried to pass a catheter (which is the wrong size, the wrong shape, poorly manufactured, and—in the end—grossly contaminated) up the unanæsthetised urethra (separated from the blood-spaces of the corpus spongiosum by the flimsiest of barriers) against a painfully contracting external sphincter. The picture of the indwelling catheter can be no less gloomy. It is often indwelling only in name: in fact, it keeps slipping out, and every time it is reintroduced the number and virulence of implanted organisms increase five, ten, or a hundred fold. When he is using a Foley-type catheter, the house-surgeon may be tempted to overstretch the bag and damage the anterior rectal wall. Or he may choose too large a tube, which contributes nothing to the ease of drainage but effectively dams back urine, pus, and mucus. One can still occasionally see a catheter being connected to a drainage-bottle, dumped between the patient's thighs, where it not only impedes all free movement in bed but also allows its contents to be siphoned back into the bladder. The pinhole internal diaphragm of certain rubber catheters is a manufacturing flaw (some would say a crime) that is often discovered only after it has caused repeated blockages; and trauma to the external meatus is not recognised until it has given rise to insidious paraphimosis. Indeed, in few surgical undertakings can neglect of a small detail lead so irretrievably to disaster as in bladder drainage; for the borderline between the localised infection that is merely a nuisance and the one severe enough to precipitate renal failure can be transgressed at any moment.

But dangerous as they are, it is neither bleeding nor infection that needs most thought and care. The ward in Hospital B, in the early hours of the morning, with half a dozen uprooted prostatectomised old men "climbing up the wall" is a forbidding place. By rights, prostatic surgery should be geriatric surgery (and that means the surgery of the future) at its best. An efficient organisation which allows most preoperative investigations to be carried out from the outpatient department, the proper selection of patients, and the highest standard of postoperative care should ensure a short stay in hospital. And there is no need for prostatic surgery to be cast in the gloom that inevitably surrounds even the best cancer surgery. A rise in the general standard calls for the coöperation of the family doctor; the help of an experienced physician; the firm guidance of the surgeon in charge of the preoperative and postoperative routine; and, above all, extra time and effort from those responsible for the day-to-day and night-to-night care of the patient in the ward. Much of the ward routine for elderly patients is obsolete: for example, contrary to what is often said, it is by no means impossible to bully the enfeebled elderly patient into mild water intoxication when "the pressing of fluids" by mouth degenerates into barrack-room drill; and to sedate him heavily during the day for inadequate reasons is to invite trouble for the night. The screaming disorientated patient, reeking of paraldehyde and rattling at his cot-sides, festooned by a maze of tubes, and barricaded from his fellows by an array of screens, is not just "a problem": he is a disgrace.

It has been said of partial gastrectomy that individual statistics are too good to be true, and massed statistics too true to be good. Perhaps this applies to all the common major operations—but to none more than to prostatectomy. Those who feel that it is neither desirable nor practicable to establish regional centres, where a few specialists would monopolise an operation that once used to be the pride of the general surgeon, should think of Hospital B, and do all they can to raise it to the standard of their own well-run departments.

Humidification

WHEN a healthy person breathes room air through the nose, the inspired air is warmed and humidified so that when it reaches the bifurcation of the trachea its temperature is 36°C and it is 98% saturated with moisture. In a patient with a tracheotomy, however, the nasal passages are by-passed and during inspiration the air at the bifurcation is very much the same as room air in temperature and humidity. In consequence, the air takes up moisture in the bronchi, and the mucous membranes and secretions become dry. This may not be a serious handicap to anyone who can cough up viscid secretions, but in patients whose power to cough is impaired it may be disastrous. In recent years this has become particularly obvious in patients with poliomyelitis, polyneuritis, or other forms of paralysis which may necessitate a tracheotomy and artificial respiration. When artificial respiration by intermittent positive pressure through a tracheotomy was first used in the Danish poliomyelitis epidemic of 1952, crusting of secretions in the air-passages soon became known as a sinister complication, and the importance of a good humidifier in preventing this was quickly appreciated. In these conditions various mechanical manœuvres—notably suction with a catheter down the trachea—have to take the place of coughing; but they are quite unable to remove encrusted secretions. The bronchi thus become blocked, and the patient's condition is perilous. If inspired air is properly humidified, this trouble does not arise, and modern respiration pumps for prolonged positive-pressure respiration include a humidifier as standard equipment.[1 2] Similar considerations apply if a patient with a tracheotomy is treated in a tank respirator, and for some time a search has been directed, in the large American poliomyelitis centres, as well as in this country, towards a means of humidifying the inspired air whenever a tracheotomy has to be performed.[3 4]

There are several fairly satisfactory methods of humidifying a gas for use in such conditions. But the familiar practice of bubbling oxygen through a few centimetres of water in a Woulfe's bottle is not one of them, for the humidity achieved in this way

1. Smith-Clarke, G. T., Galpine, J. F. *Lancet*, 1955, i, 1299.
2. Russell, W. R., Schuster, E., Smith, A. C., Spalding, J. M. K. *Ibid*, 1956, i, 539.
3. Bower, A. G. Acute Phase of Poliomyelitis. London, 1954.
4. Kelleher, W. H., Medlock, J. M., Powell, D. G. B. *Lancet*, July 14, 1956, p. 68.

is negligible. In one method which has proved convenient for patients receiving positive-pressure respiration, the gas is passed over a considerable area of warm water maintained by a heater and thermostat at a temperature slightly above body-temperature.[5] In another method which has been used in America for patients with tracheotomies in tank respirators, water is sprayed as a mist into air at room-temperature, the density of the mist being approximately adjusted so that most of the water droplets are vaporised as the air is warmed in the lungs to body-temperature. Other devices, simpler but less efficient, attempt to return to the patient's inspired air the water that condenses from the expired air.[6] It is usually sufficient to saturate the inspired gas with water *vapour* at body-temperature; but if the aim is also to introduce antibiotics or detergents into the lungs as a suspension of *droplets*, difficulties immediately arise. Some of the problems involved have recently been reviewed by ARNOLD and TOVELL.[7] The size of the droplets determines the part of the lung they reach. Droplets 10–30 μ in diameter reach the terminal bronchioles, and those 0·5–3 μ in diameter penetrate to the alveoli themselves. Those smaller than 0·5 μ, however, tend to enter the alveoli and leave them again, to no useful purpose. Various devices have been designed to provide particles of the right size; but particle size is very hard to measure, and, moreover, it changes very rapidly, because the droplets are continually agglomerating and disrupting.

It seems probable that the lessons learned about the benefits of humidification in artificial respiration can be applied to other disorders in which the power to cough is impaired. There seems to be a place for this simple form of treatment for any patient who cannot cough up his sputum, as in asthma and emphysema, and in tracheobronchitis, especially with a tracheotomy. The principle is the same as the old-fashioned steam kettle, whose benefits have long been established but with which it is difficult to apply the steam where it is most needed, and with which there is a distinct risk of a serious scald. These possibilities are being explored on both sides of the Atlantic—with promising results.

5. Marshall, J., Spalding, J. M. K. *Ibid*, 1953, ii, 1022.
6. Walley, R. V. *Ibid*, 1956, i, 781.
7. Arnold, G. T., Tovell, R. M. *Anaesthesiology*, 1956, **17**, 400.

Annotations

ANTENATAL RECOGNITION OF GENETIC DISEASE

IN this country termination of pregnancy is legal only if the continuation of the pregnancy would endanger the life or health of the mother. In many other countries eugenic indications—that is, a serious risk that the child will be abnormal—are valid grounds for termination; and the Abortion Law Reform Association have included eugenic indications in their draft Bill for England and Wales. From the family history it is possible to do no more than give a probability that a particular pregnancy will result in a child with genetically determined disease: for example, the 1 in 2 probability that an achondroplastic parent will have a similarly dwarfed child, the 1 in 4 probability that a woman who carries the sex-linked gene for hæmophilia will have a boy with hæmophilia, and the 1 in 4 probability that a mother who has had one child with the recessive type of gargoylism will have another. Obviously some method of deciding more precisely whether a particular fœtus has the gene for abnormal development or not would be very helpful.

Edwards[1] and Sachs and Danon[2] have suggested some of the possibilities raised by recent work on cells in the fœtal amniotic fluid and on linkages between pathological genes and other normal marker genes. The most straightforward linkage, as Edwards notes, is with sex, which can now be distinguished from amniotic-fluid cells. Where the fœtus is male and the father has a pathological gene on the non-homologous part of his X chromosome, the fœtus is certainly unaffected; if the fœtus is female, it certainly has the gene. Other useful linkages would be with blood-group antigens. Only three such linkages are known at the moment: elliptocytosis with the Rh antigens,[3] nail-patella syndrome with ABO antigens,[4] and congenital ptosis with the MNS antigens[5]; but new discoveries will no doubt come quickly. Coombs et al.[6] recently demonstrated that the ABO groups could be determined from epidermal cells; and Fuchs and his co-workers[7] have shown that an individual's antigenic structure may be determined from amniotic-fluid cells late in pregnancy. In a letter on p. 356, Dr. Sachs and his colleagues report success as early as the 11th week of pregnancy. But such linkages will not provide a 100% certainty that the fœtus is abnormal. First, the parental genotypes may be such that it is not possible to distinguish the marked chromosome. More important, except with the rare instances of very closely linked genes, there is always the possibility that pathological gene and marked gene have been separated by crossing over during germ-cell formation. The probability of such crossing-over can be estimated and allowance must be made for it.

Another technique, also much in the future but more direct and potentially more powerful, is the recognition of the presence or absence of the abnormal gene in amniotic-fluid or cord-blood cells by their biochemical behaviour, particularly where ample material may be grown by tissue-culture.

There is no doubt that such methods will in time be usefully applied. An anxious mother can then be told that this particular pregnancy will not result in a handicapped child; and the obstetrician can know that the pregnancy he is asked to terminate is almost certainly an abnormal one.

1. Edwards, J. H. *Lancet*, 1956, i, 579.
2. Sachs, L., Danon, M. *Ibid*, p. 1013.
3. Goodall, H. B., Hendry, D. W. W., Lawler, S. D., Stephen, S. A. *Ann. Eugen., Lond.* 1953, **17**, 272.
4. Renwick, J. H., Lawler, S. D. *Ibid*, 1955, **19**, 312.
5. Hösli, P., Hassig, A., Franceschetti, A. Proceedings of 1st International Congress of Human Genetics. Copenhagen, 1956 (in the press).
6. Coombs, R. R. A., Bedford, D., Rouillard, L. M. *Lancet*, 1956, i, 461.
7. Fuchs, F., Freiesleben, E., Knudsen, E. E., Riis, P. *Ibid*, p. 996.

COMPLICATIONS OF MEASLES

AMONG its many activities, the College of General Practitioners has undertaken a survey of measles, and it has now recorded the first part of the inquiry in a report[8] entitled The Complications of Measles, though it deals more with the question of prophylaxis than with the complications themselves. This is a venture to be warmly welcomed; for it should provide information about a group of patients not available for study by hospital research teams. If the type of work is new, so are the difficulties facing those who undertake it, and the report makes this clear.

The main difficulty in any survey of this kind is to decide what is a complication and what is not. This is especially true in chest and ear infections; for it is hard

8. The Complications of Measles. A report by a study group of the College of General Practitioners. Obtainable from the College, 14, Black Friars Lane, London, E.C.4, price 2*s*.

to know whether they are part of measles or due to secondary bacterial invaders. If they are part of measles, it would be unreasonable to expect any known treatment to have a preventive action; but the report does not say how this problem was tackled. Information about the types of complication is confined to the control group, which is divided under the headings: acute otitis media, other aural conditions, acute chest (including bronchitis, pneumonia), other chest conditions (including laryngitis), eyes, others. The group given prophylactic drugs is not subdivided, and unstated complications are expressed as percentages of total cases. Hence one cannot tell what diagnostic criteria were used.

These shortcomings make the report's conclusions less convincing, but they are nevertheless interesting. The college's study-group believe that the prophylactic use of antibacterial drugs is of little benefit to a child undergoing an attack of measles of ordinary severity—and indeed it may do harm. But in a severe attack, they say, it can do some good. The report continues: "If pulmonary complications are anticipated, the drug of choice is an antibiotic—in this investigation mainly oral preparations of penicillin were used. If otitis media is present or expected, sulphonamides may be of more benefit than antibiotics." Finally, the study-group conclude that there is nothing to commend the routine use of sulphonamides, "since this increases rather than reduces the total complications rate"; and "the routine use of antibiotics in measles is expensive and largely unnecessary."

The new college will undoubtedly add much to future knowledge by surveys of this kind. General practitioners are seldom as well equipped as hospital research-workers to collect information about patients; but perhaps in this measles inquiry their capacities were underestimated. Many people would like to know more about the patients they treated and the complications they observed.

HIGH HEELS

THE designer of footwear must prepare not only to cover feet of all shapes and sizes but to satisfy those who demand that shoes shall attract attention. Elegance and utility rarely go hand in hand, and often selection is controlled by fashion rather than function. In the past the more outrageous styles were curbed by royal proclamation. Thus when the poulaine became well established its length had to be limited: "people of low state were permitted to wear them half a foot long, citizens one foot long, knights one and a half feet, and barons two feet." The long shoe was succeeded by the broad shoe (in orthopædic favour again today), and the shoe became so broad that Queen Mary was forced to limit its width to six inches. The high heel, dating from the 16th century, shows no sign of falling out of favour; and it is not to be supposed that the electromyographic studies of Joseph and Nightingale [1] will undermine its prestige.

When men stand in the relaxed position their calf muscles usually show detectable activity. In women with low-heeled shoes similar activity is present; but with high heels the activity of these muscles is increased. This may be related to the necessity for continued contraction in a slackened calf muscle. The electromyograph shows occasional bursts of activity in other muscles, suggesting that the high heel is associated with instability. The activity in these other muscles has also been noted by Basmajian and Bentzon.[2]

Joseph and Nightingale do not suggest that this muscular activity is undesirable. Nevertheless the high heel is often blamed for foot deformities and pain. For these the increased weight borne by the front of the foot is largely responsible; but nylon stockings, which allow the foot to slide forward on the sloping surface, have also been held at fault. To these criticisms most women will turn a deaf ear.

1. Joseph, J., Nightingale, A. *J. Physiol.* 1956, **132**, 465.
2. Basmajian, J. V., Bentzon, J. W. *Surg. Gynec. Obstet.* 1954, **98**, 662.

H.M.C.

THERE are some 7000 members of hospital management committees in England and Wales. Even if they do not all devote the 6 to 8 hours weekly suggested as necessary to the conscientious member, their work is perhaps the largest single aggregate of voluntary effort dedicated to a particular purpose. These 7000 persons are largely responsible for the hospital services, which, through their $3^1/_2$ million inpatients and 33 million outpatient and casualty attendances every year, directly affect more people than any other social service except the educational system. It is therefore surprising that no general guide or vade-mecum to help the H.M.C. member in his work has yet appeared, and the one now provided by Mr. Stuart-Clark [1] is all the more welcome. As chairman of a hospital group and as the senior tutor at the Hospital Administrative Staff College of the King's Fund, he is well qualified on both practical and theoretical grounds to give this guidance, and he covers the whole field, from appointments to visiting, in fewer than 70 pages.

The member of a management committee of a hospital group is a vital part of that inchoate, illogical, administrative structure which we like to think of as typically English because—we flatter ourselves—though woolly, it works. "Owing allegiance to no electorate, he is responsible for the proper spending, under the general policy of the Ministry of Health, of public funds, and his nomination to the committee by the regional board is based entirely on personal qualities and the contribution it is thought he may be able to make as an individual and in no way as representative of any organisation." Although hospital management committees control and manage their hospitals on behalf of the regional hospital boards, they have a legal entity—they are *personnes morales* in French legal terms—and have legal rights and can sue or (as some know to their cost) be sued. Since the National Health Service is a unified but not a uniform service, hospital management committees have considerable latitude in the way they do their work, as Mr. Stuart-Clark emphasises. "On a huge hill, Craggy and steep, Truth stands, and hee that will Reach her about must, and about must goe." This is as it should be, since the rewards of membership are not conspicuous and the attraction of responsibility and power to experiment must be retained. The Guillebaud report pointed out that it is not surprising that there should be wide differences of opinion as to the amount of control which should properly be exercised at each level of management of the National Health Service—i.e., the Ministry, regional board, management committee, and house-committee. "Nor is it surprising that each level of management should urge the one above to loosen its controls and to leave more responsibility to its agents. A problem common to all large organisations is how to devise a measure of control and supervision which will ensure that the public are provided with an efficient service at a reasonable cost—and yet without stifling the initiative or restricting too closely the responsibilities of those who are providing the service 'on the ground.'" The real test is whether the amount of frustration imposed on management committees—some of which is inevitable—is so great that able and conscientious men and women are no longer attracted. Whether or not this is happening to any serious extent the guidance given by Mr. Stuart-Clark should inform and assist the old member as well as the new recruit to this invaluable voluntary service.

1. Administering the Hospital Group. The Work of the Management Committee Member. By A. C. STUART-CLARK, M.A. London: The Institute of Hospital Administrators. 1956. Pp 66. 3s. 6d.

LUNG COMPLIANCE

By means of the increasingly used method of the pressure-volume diagram, Cherniack [1] has lately measured the compliance and flow-resistance of the lungs in healthy persons and in patients with chronic obstructive emphysema. The pressure across the lungs—that is from pleural cavity to the atmosphere—was measured as œsophageal pressure; although the absolute level of œsophageal pressure is not the same as the intrapleural pressure, the variations in each during respiration are closely parallel. The volumes of air breathed were integrated from air-flow rates measured with a pneumotachometer, and plotted against corresponding pressures to give a pressure-volume diagram from which could be derived the flow-resistance at different flow-rates and the compliance of the lungs.

Flow-resistance is derived from the dynamic component of the transpulmonary pressure—namely, that part of the pressure required to produce flow, as distinct from the part required to overcome elastic forces—divided by the flow-rate. Compliance is conveniently measured as the tidal volume divided by the pressure difference between instants of no gas-flow in the trachea at end-expiration and end-inspiration; it may be determined from static measurements, as opposed to flow-resistance with which it is 90° out of phase; but the association of flow-resistance and compliance together in the same system (that is, in the lungs) means that the value obtained for the compliance for any given tidal volume is partly determined by the frequency of respiration, and thus when measured during respiration, and not statically, it is usually referred to as the effective or functional compliance.

Cherniack also used the interruption technique to determine flow-resistance; the difference between mouth pressures just before and just after interruption of air-flow at the mouth-piece gives the pressure component required to overcome flow-resistance at the rate of flow just before the interruption. This method depends on the rapid equalisation of pressures throughout the lungs immediately flow is stopped, so that the mouth pressure nearly equals alveolar pressure, since alveolar volume is so much larger than the remainder of the lung volume.

Cherniack's data show high static compliances in emphysematous patients, but decreasing compliance with increasing respiratory rate (that is, the lungs become stiffer) due to a large element of flow-resistance; the flow-resistance was greater than in normal subjects, and could be lowered by a nebulised bronchodilator. In the normal persons, static and functional compliances did not differ greatly from each other. Stead et al.,[2] however, found low static compliances in their emphysematous patients, and Cherniack suggests that this may have been due to the presence of fibrosis and congestion, as in his second group of abnormal subjects who had right-sided heart-failure and who also showed decreased static compliances.

These observations are in general accord with other current work, and their interest lies in the interpretations of lung mechanisms which they suggest. Cherniack supports the concept of non-uniformly distributed viscous resistance in the emphysematous lung; with slow inspiration the viscous element is virtually eliminated, so that both high and low resistance areas of the lung will take part in the ventilation, and a high compliance value will result. This is an attractive hypothesis which fits in with observed variations in gas-mixing in the lungs, and with possible mechanisms of ventilation distribution in the lungs as described by Otis et al.[3] Invoking two types of flow-resistance—air-flow and tissue-flow resistances—would also provide a suitable hypothetical basis for explanation. Other factors, such as the surface tension of the lining layers of the airways, have recently been recognised as of potential importance in determining the forces required for respiratory movements. A better understanding of the mechanisms involved in deciding the level of "respiratory hindrance" would greatly help the therapeutic approach.

1. Cherniack, R. M. *J. clin. Invest.* 1956, **35**, 394.
2. Stead, W. W., Fry, D. L., Ebert, R. V. *J. Lab. clin. Med.* 1952, **40**, 674.
3. Otis, A. B., McKerrow, C. B., Bartlett, R. A., Mead, J., McIlroy, M. B., Selverstone, N. J., Radford, E. P. jun. *J. appl. Physiol.* 1956, **8**, 427.

MALARIA IN SOUTH-EAST ASIA

Within the region of South-East Asia, extending from India to the Philippines, there are some 23 countries and territories with an aggregate population of more than 650 million (about a quarter of the world's total); and some 280 million of them live in malarious areas. In these countries, many anti-malaria schemes are in progress, protecting, more or less efficiently, about 84 million people—about 30% of those at risk. The World Health Organisation has arranged two malaria conferences in this region, and the report [1] of the second meeting, in November, 1954, has lately been published.

This sober document is tinged alternately with optimism and anxiety. On the hopeful side, systematic use of residual insecticides offers a reasonable chance of eradicating malaria from enormous areas by moderate intensification of the efforts already in progress for a few years. Where transmission can be arrested for a year or two, the plasmodium will die out in the human carriers and the disease will be extinct. While the residual insecticides remain effective, the expense is not prohibitive, being about 1*s.* 6*d.* per head per year. Considering the many economic and social losses due to malaria, it may well be said that "no country with a serious malaria problem can afford *not* to control it." The grounds for anxiety lie in the development of resistance to insecticides, which has already arisen in four different anopheline malaria vectors, one of them (*Anopheles sundaicus*, in Indonesia) within the region concerned. It is impossible to foresee whether resistance to insecticides will prevent the eradication of malaria, but it is clear that inefficiency in the conduct of the campaigns and, in particular, the lagging behind of patches of malarious country will favour resistance and prejudice the whole advance. Certainly no country will be able to slacken residual-spray programmes while infected pockets remain in or near the protected territory. It is to be hoped, therefore, that international meetings may foster coöperation and coördination between the countries concerned. In any case, they provide opportunities for the experts to agree on methods of training personnel and of recording and reporting malariometric and entomological data and to discuss research and control methods. While residual insecticides can be widely used with success against malaria, their value and the best methods of use vary in different regions, according to the habits of the local vector. In a few places, they may be virtually useless because the mosquitoes do not rest in houses long enough to be killed. These facts emphasise the importance of scientific study of individual malaria problems and the value of supplementing insecticides by drug prophylaxis and other measures in special circumstances.

1. *World Hlth Org. tech. Rep. Ser.* 1956, no. 103. Pp. 50. 1*s.* 9*d.* Obtainable from H.M. Stationery Office, P.O. Box 569, London, S.E.1.

The Index and title-page to Vol. I, 1956, which was completed with The Lancet of June 30, is published with our present issue. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of The Lancet, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

Conferences and Congresses

INTERNATIONAL CONGRESS OF HUMAN GENETICS

THE First International Congress of Human Genetics was held in Copenhagen on Aug. 1–6. Mr. JULIUS BOMHOLT, the Danish Minister of Education, welcomed the members and dwelt on the concern with which his government and those of other nations view the genetic hazards which may arise from the peaceful use of atomic energy in the future. The World Health Organisation intended to organise a permanent committee which was to consider means of protecting future generations against an increase in harmful mutations.

Prof. TAGE KEMP (Denmark) was unanimously and enthusiastically elected president of the congress.

Mutation in Man

Prof. G. MONTALENTI (Italy) expressed surprise that this first congress had not been convened before 1956. He recalled Galton's early efforts to establish a quantitative basis for human genetics, and the long interval before Fisher and Haldane (and, he might have added, himself) began to devise statistical methods which led to the human population genetics of the present day. Up till then most of the significant contributions had been derived from the study of plants and Prof. H. J. Muller in which he showed the effect of radiation animals. A most important experiment had been that of on the mutation-rate of genes. It was not fortuitous that the first congress had been convened in Denmark, where an exemplary investigation of a homogeneous population had been carried out by Tage Kemp and his school.

H. J. MULLER (U.S.A.) said that multilocal mutants were responsible for most inherited syndromes. Thus the "short bristle" mutation in the drosophila involved more than 30 different genes. At the present stage of human evolution nearly all mutations were detrimental. Russel had examined 8 mutants of independent origin in a study of 200,000 mice, and had arrived at a mutation-rate of 1 : 100,000 for each locus; and there was a similar order of magnitude in man. With 10,000 alleles and pseudo-alleles this would represent 1 mutation for every 10th germ-cell. As man was the product of 2 such cells, one had to assume a new mutation for every fifth birth. The very large majority of such mutants were recessive, and led to disadvantages, or to genetic death, only in homozygotes. This homozygous effect could be tested empirically by examining the death-rates among the offspring of first-cousin marriages, where there was a greater chance for homozygotes to arise. The reduction of survival in their first 20 years of life was 6% greater in the offspring of inbreeding than in that of the control population.

L. S. PENROSE discussed the pitfalls awaiting the unwary who calculated mutation-rates on the assumption that the rate of mutation for a disadvantageous gene could be deduced from the number of affected homozygotes born. Fisher's theory of heterosis, according to which a gene which was detrimental in the homozygote was actually of advantage in the heterozygote, helped to explain why such genes could persist at high frequency in a population. One and the same effect might be due to opposing forces. A low birth-rate in families with high intelligence could be due to family planning, whereas lower viability reduced the more numerous offspring in families with low intelligence. The sensitivity of human loci to radiation of all kinds could be measured by studying the effect of age of parents and grandparents on the mutation-rate of their offspring. The germ-cells of a person aged 40 had been exposed to radiation twice as long as they had been at the age of 20. In offspring with chondrodystrophy or acrocephalosyndactyly the father's and grandfather's ages were significantly greater than in the general population.

J. V. NEEL (U.S.A.) described observations on 80,000 pregnancy terminations in Hiroshima and Nagasaki between 1946 and 1953. No evidence of genetic damage had been found; but this did not exclude the possibility that damage might become apparent in future generations, or that damage might have been discovered in the present generation by means of different yardsticks.

T. C. CARTER pointed out that most calculations of mutation load are based on assumptions which have not been fully substantiated. One of them was that all mutations were detrimental because all the advantageous ones must have arisen in the past and then have maintained themselves. Slightly disadvantageous genes might become advantageous in different surroundings.

R. TURPIN (France) had found some genetic damage in the children of men and women who had for one reason or another received radiation of the pelvis.

Twin Studies

O. VERSCHUER (Germany) stated that variations between monozygotic twins were not necessarily environmental. The parts played by heredity and environment were better judged by comparing three twin partnerships: monozygotic and dizygotic twins in the same environment, and monozygotic twins in different environments. Twin studies were particularly helpful in establishing whether diseases were conditioned by inheritance. In tuberculosis there was concordance in three-quarters of the monozygotic, but in only a quarter of the dizygotic, twins. This was strong evidence of an inherited disposition. Cancer as a whole showed no significant concordance in monozygotic twins.

G. ALLEN and F. J. KALLMANN (U.S.A.) had found 3 pairs of monozygotic mongoloid twins, but 23 dizygotic twin pairs with one partner unaffected. The ætiology of mongolism must be sought, not among noxious influences during pregnancy, but among effects on the ovum before twinning.

N. JUEL-NIELSEN and A. MOGENSEN (Denmark) had examined 9 pairs of uniovular twins, aged 22–72 years, who at an early age had been adopted into different families. Some of them did not know of each other's existence. The current policy in Denmark was not to separate twins which were to be adopted.

NORMA F. WALKER (Canada) reported on 1300 placentas of twin pairs which had been collected from 1937 to 1956. Monozygotic twins formed a graded series related to their "twinning-time." They could be mono-amniotic, monochorionic with common fœtal circulation, monochorionic with separate circulation, or dichorionic.

Inbreeding

L. L. CAVALLI-SFORZA (Italy) described how otherwise neutral genes might acquire a selective advantage when they were introduced into an inbreeding population, just because they came from outside and therefore increased the chance of heterozygosity for genes which were advantageous in the heterozygous condition.

H. M. SLATIS and R. H. REIS (U.S.A.), A. A. BÖÖK (Sweden), and E. RÜDIN (Germany) each had examined the children from first-cousin marriages. A convenient way of finding such marriages was from marriage registers in Roman Catholic communities, where these unions required special dispensation. Comparison with the offspring of non-consanguineous marriages indicated that the normal individual possessed a minimum of three genes which might become deleterious when inherited in the homozygous condition.

Demographic Trends

F. OSBORN (U.S.A.) and T. MCKEOWN each discussed changing demographic trends. The prolongation of the average life-span had doubled the chance of reproduction for individuals. Thus death now tended to remove only seriously defective genes, and it no longer operated to select the genes which underlay man's higher qualities. Reduction of the family size reduced the area within which births might operate as factors for selection, and the breaking up of geographical boundaries (rather than enlarging the random type of mating) gave a larger opportunity for selection of partners who were similar in characteristics of personality and intelligence. All these tendencies changed the assumptions on which population genetics were based.

Counselling

E. W. REED (U.S.A.) compared counselling in medical genetics in the United States and in Denmark. Much of his work was done by correspondence because of the great distances. New centres for genetic counselling were being established all the time, and it was hoped that soon persons

anywhere in North America, including Canada, would be within easy travelling distance of a heredity clinic.

Blood-groups

R. A. FISHER regarded the discovery of the blood-group systems as the fundamental revolution in human genetics of recent years. These systems provided useful genetical markers for about half the human chromosomes. There had to be added the "honorary blood-groups," such as the secretion factor or the capacity to taste phenyl-thiocarbamide, and the common anomalies of colour-vision known as Daltonism—a marker for the sex chromosome. There was a cynical view that those responsible for making the current improvements in our knowledge were becoming more and more narrow specialists. Those who had followed the discoveries of the last few years in the field of human blood-groups alone would make the exactly opposite generalisation. Fields of study hitherto disparate were suddenly seen to be inseparably linked, and to fall into place as aspects of a single science, distinguishable only by differences of training and technique. No better example of the merging of specialties could be found than the research on blood-groups.

A. E. MOURANT compared the very varied distribution of the ABO blood-groups in Western Europe with the uniform distribution of the rhesus and MNS blood-groups. Similarly in Africa the ABO system was unstable, but the rhesus and MNS systems—though different from other parts of the world—were stable in widely varying populations. Genetic drift would have affected all the different systems. Thus the ABO groups must have been singled out by natural selection.

J. A. FRASER ROBERTS said that compared with the general population the relative frequency of group O to groups A, B, and AB was 1·6 in duodenal ulcer and 1·2 in gastric ulcer. There was a relatively higher frequency of group A in carcinoma of the stomach, pernicious anæmia, and diabetes, and possibly also in portal cirrhosis. No association with blood-groups had been found in carcinoma of the bronchus, colon, or rectum, in hypertension, or in toxæmia of pregnancy.

E. MAYR and his colleagues (U.S.A.) had found a significant excess of group O in a small series of patients with chromophobe adenoma of the pituitary. Of 150 patients with glioblastoma multiforme only 3 had been Rh-negative.

R. B. MCCONNELL and P. M. SHEPPARD had determined the secretor status in 600 cases of duodenal ulcer and in 491 controls from the general population. The frequency of non-secretors was higher in the ulcer patients.

J. MOSBECH and M. HAUGE (Denmark) had found a preponderance of group A in patients with achlorhydria.

Hæmoglobins

H. LEHMANN surveyed the rapid developments in the field of normal and abnormal hæmoglobins; there were now known more than ten. There was a need to combine laboratory and clinical diagnosis with family studies, and he showed examples where any two of these by themselves would have failed to establish the correct diagnosis. In Africa hæmoglobins S, C, J, and G were all present at different stages of distribution, and in Asia hæmoglobins D and E were taking a part similar to that occupied by the sickle-cell in Africa.

A. C. ALLISON described how malaria selectively favoured the sickle-cell heterozygote. In West Africa the genes for sickle-cell hæmoglobin and for hæmoglobin C were at a near-stable equilibrium.

Hereditary Disorders

A. GIORDANO (Italy) suggested that the hereditary diseases of osteocartilaginous tissue—chondrodystrophy and osteogenesis imperfecta—were associated with a deficiency of enzymes.

C. LEUCHTENBERGER (U.S.A.) had examined 600 human rectal polypoid tumours, including those of the hereditary type, and had found in all of them cytoplasmic inclusion-bodies, containing desoxyribose nucleic acid, which were strikingly similar to those found in virus diseases.

A. G. MOTULSKY (U.S.A.) described hereditary spherocytosis in a mouse strain, caused by a single recessive autosomal gene mutation. As in man there was reduced red-cell survival and engorgement of the splenic pulp with red cells. Splenectomy abolished the hæmolysis.

D. ADLERSBERG (U.S.A.) stated that two inborn errors of lipid metabolism were closely related to atherosclerosis—idiopathic hyperlipæmia and idiopathic hypercholesterolæmia. Though these two were distinct conditions family studies had established that they were genetically related and that they were probably the expressions of the same genetical disorder at different penetrance.

G. W. F. EDGAR (Holland) surveyed the lipoidoses. Sphingosine was common to sphingomyeline, the cerebrosides, and the gangliosides. The deposition of these was not restricted to the central nervous system. The visceral organs contained increased levels of cerebrosides and sphingomyeline in Gaucher's disease, of cholesterol in cholesterinosis, of gangliosides in Niemann-Pick disease, and of mucopolysaccharides in gargoylism.

M. LAMY (Paris) stated that there were two forms of gargoylism. One, with autosomatic dominance, was severe and was always associated with clouding of the cornea. In the other the mode of inheritance was sex-linked and recessive; there was deafness but no clouding of the cornea, and the condition was less severe.

R. A. MILCH (U.S.A.) suggested that alkaptonuria was not a disorder of the homozygote, but that an additional gene mutant in the heterozygote acted as a modifier to cause penetrance in the phenotype.

D. YI-YUNG HSIA (U.S.A.) had discovered heterozygous carriers of the gene for phenylketonuria by a phenylalanine-tolerance test. The blood-level of phenylalanine was raised, but phenylpyruvic acid was not excreted in the urine. The homozygous condition showed an incidence of 1 : 40,000. Hence 1% of the population were heterozygotes and it should be possible to discover them by the tolerance test.

H. LEHMANN described how people with low plasma-cholinesterase were discovered by their undue sensitivity to the muscle relaxant, succinyldicholine. A low enzyme level could be caused by disease of the liver. But in some families a low enzyme level was an inherited condition.

A. G. BEARN (U.S.A.) regarded failure to synthesise the copper-containing plasma-protein ceruloplasmin as the primary inherited defect in Wilson's disease. The unbound copper damaged the brain, the liver, and the kidney. The increased amino-aciduria was a secondary effect due to the deposition of excessive copper in the proximal renal tubules. There was nothing specific in this amino-aciduria, and the uric-acid excretion was similarly affected.

A. FRANCESCHETTI (Switzerland) had examined 103 people with hereditary ptosis. In collaboration with P. Hösli and A. Hässig more than 400 possible linkage relations were tested, involving 34 serological and anthropological chromosome markers and 130 sibpairs. A highly probable linkage between blood-group system MNS and the gene responsible for ptosis was demonstrated.

Diabetes Insipidus

C. O. CARTER described the distinction of the two sex-linked forms of diabetes insipidus by the failure of the nephrogenic form to respond to pitressin. Women likely to be heterozygous for the gene could be recognised by a simple measurement of urine concentration. Their detection was important as it led to an early recognition of their affected sons, who were polyuric from infancy, and in whom failure to maintain hydration might lead to mental impairment and even death.

Diabetes Mellitus and Parity

B. M. ASCHNER and R. H. POST (U.S.A.) had found a higher parity in women with diabetes mellitus. They forecast that the successful treatment of diabetic patients would lead to a doubling of the incidence of the homozygote within the next 5–10 generations.

Serum in Rheumatoid Arthritis

R. GRUBB (Sweden) observed that the sera of some arthritic patients agglutinated human red cells coated with incomplete human antibodies. This agglutination was inhibited when pooled human γ-globulin was added. Thus the arthritic sera were deficient of a factor present normally in the γ-globulin fraction. The absence of this factor was an inherited feature.

Spermatozoa and Chromosomes

J. SCHULTZ-LARSEN (Denmark) showed electromicrographs of human spermatozoa, which clearly revealed that the central fibre of the human spermatozoon consists of 11 fibrils which may split again into 22 filaments. The head has a "galea capitis," a non-chromosomal structure resembling a sack pulled over the forepart of the head.

J. TJIO (Sweden) showed preparations of human embryonic-lung fibroblasts in division. It was seen that the number of the human chromosomes is 46, not 48 as has hitherto been supposed.

C. E. FORD and J. L. HAMERTON had examined human spermatogenesis and had arrived at a chromosome number in man of $2n = 46$, not $2n = 48$ as was generally believed, thus complementing the results obtained on somatic cells. They had counted the chiasmata in three human males and found a range from 49 to 62 with a mean of 55. This enabled them to make a first estimate of the total genetic length of human chromosomes—namely 27·5 Morgans.

Organisation

A committee was set up which will make proposals for a second congress in 1960 and possibly the foundation of an International Society of Human Genetics. Much of the success of this first congress was due to the faultless organisation by Prof. Tage Kemp and his Danish helpers, particularly Dr. Mogens Hauge. Signs of the respect in which Prof. Tage Kemp is held by his countrymen were the receptions to his colleagues, given by university, city, and government.

INTERNATIONAL CONGRESS OF PHYSIOLOGY

THE Twentieth International Congress of Physiology was held in Brussels from July 30 to Aug. 4, and was attended by nearly 3000 members from all parts of the world.

The heavy scientific programme consisted of over nine hundred short papers and seven symposia.

Physiology of Thirst and Appetite

B. ANDERSSON (Sweden) referred to observations which have shown that the main factor in eliciting the sensation of thirst is a deficiency of water relative to certain extracellular electrolytes. The sensation has been thought by some to originate in special thirst receptors and by others to be of general origin. There is some evidence that the hypothalamus is connected with the regulation of the intake, as well as the excretion, of water. Andersson described experiments which support this belief and showed how continuous stimulation of a region in the hypothalamus caused polydipsia in a goat, which could be induced to consume water equivalent to 40% of its body-weight in a few hours. A "drinking area" has not been finely localised, nor has it been shown that such an area is essential for the development of an urge to drink. Extension of the area of hypothalamic stimulation may much reduce or abolish the impulse to drink or may cause animals to refuse water when they will accept soup or milk. Although it seems certain that a thirst centre exists nothing is known about its connection with other parts of the brain, and the removal of most of the cerebral cortex in the sheep does not abolish drinking.

J. R. BROBECK (U.S.A.) discussed the neural control of hunger, appetite, and satiety and pointed out that a large field lies open for study of the effects of lesions at various levels of the neuro-axis in species below mammals. Injury of the hypothalamus has shown that it plays an important part in the sensation of appetite and satiety. He suggested, however, that the cerebral cortex is important for normal feeding responses—perhaps mainly the choice of suitable foods and circumstances for feeding—whereas the hypothalamic centres regulate the amount and frequency of feeding.

J. MAYER (U.S.A.) suggested that more precise and instantaneous recording of the food and water consumed would allow of more accurate analysis of qualitative as well as quantitative changes in food consumption. By such means a new conception of appetite and satiety may be obtained, especially during dietary modifications. Food intake has individual and species characteristics and may be determined by factors which in part are conditioned by the rate at which the products of eating and consequent metabolism can be dissipated.

Hypothermia

E. NEIL pointed out that, although intensive studies had been made of the effects of hypothermia alone, comparatively little is known of the effects of hypothermia combined with arrest of the circulation. Reduction or stoppage of blood-flow is probably the only justification for the introduction of hypothermia into clinical practice, and this circulatory arrest appears to lead to some adverse effects which are more harmful than anything which results from cooling alone. It is not enough to be able to restore to normal the body-temperature of the cooled patient: function also must be restored, and to achieve this some compromise must be reached between functional disturbances, which become increasingly common and severe below 25°C, and the desire to reduce oxygen requirements by cooling and so prolong the tolerance to circulatory arrest.

Neil reviewed the metabolic, circulatory, and respiratory changes associated with moderate cooling alone. Although total and cerebral oxygen usage falls to a third of normal at 25°C, that of the heart is reduced by only half and the ratio of cardiac to total oxygen usage at 25°C is higher than normal. An increased peripheral resistance is due to the direct effect of cold on the peripheral vessels, combined with an increase in blood-viscosity due to hæmoconcentration following reduction in plasma-volume. Coronary blood-flow is reduced by less than half at 26°C, although the left ventricular work falls to about 20% of normal. Blood-stream cooling causes more severe electro-cardiographic disturbance than surface cooling, and mechanical stimulation of the heart itself is the commonest factor precipitating ventricular fibrillation. Neil pointed out that, whereas in many experiments on cooled animals the chest wall is intact, in the majority of patients who have been studied the chest wall has been more or less widely opened by the surgeon. It is well recognised that blood pH steadily decreases as the body-temperature falls; during spontaneous respiration in the dog this acidosis is due largely to increased alveolar pCo_2, but there is usually also an underlying metabolic acidosis. It is doubtful whether respiration is adequate even when the chest wall is intact, and the importance of maintaining adequate respiratory exchange during operations on the open chest is clearly great. Circulatory occlusion during hypothermia has been shown to cause severe structural and functional changes in the liver. These changes can be related to the combination of anoxia and venous congestion and are less pronounced when congestion is prevented by aspiration of the vena cava.

M. SCHNEIDER (Germany) discussed the changes in the central nervous system. Irreparable damage results only when ice forms in the tissues or asphyxia follows cardiac or respiratory failure. It is difficult to make quantitative statements because of variation in anæsthetic and cooling techniques, the latter in particular leading to variations in tissue temperatures at different depths. During cooling there is an increase in activity down to temperatures which vary in different parts of the nervous system, but beyond this individual critical point excitability decreases and eventually is usually abolished. In man at 32°C the subject can still be aroused and various actions such as eating are possible, though slowed; but there is amnesia. At lower temperatures the general state resembles that of anæsthesia, but it is hard to exclude the residual effect of the initial narcosis. Oxygen consumption of brain and spinal cord falls almost linearly with temperature. The duration of complete ischæmia from which survival is possible increases as the temperature falls, but recovery time also is affected. Whereas the rate of recovery at higher temperatures tends to be lengthened by a higher energy consumption of the tissue, it also tends to be reduced by a more rapid recovery process. At low temperatures the reduced energy consumption is offset by a reduced rate of recovery. At or below 23°C recovery can be accelerated by rapid re-warming of the brain, but whether this method could be safely applied at higher temperatures in man seems questionable. Chlorpromazine alone or in combination as a "lytic" mixture does not lower

cerebral oxygen consumption. Deep anæsthesia shortens the critical period of recoverable ischæmia, and the quantity of anæsthetic agents used should be reduced as much as possible.

J. GIAJA (Yugoslavia) discussed metabolism during deep hypothermia and summarised methods of producing the cold state. He emphasised that not all degrees of cooling reduced metabolism and that there was a wide species variation in tolerance of cooling.

Physiological Effects of Gravitational Stress

R. EDELBERG (U.S.A.) discussed the rôle of cardiovascular activity as a prominent cause of the variability in tolerance to positive acceleration, and presented evidence supporting the hypothesis that the threshold for blackout depends on reflex activity which begins almost immediately after the onset of acceleration. Differences in G tolerance may depend on the wide individual variations in the rate of reflex adjustment to gravitational stress. Slow acceleration is accompanied by an increased tolerance, which indicates that there must be some compensation against venous pooling of blood. By inserting small water-filled balloons in the saphenous veins of dogs reflex venoconstriction was shown to follow positive acceleration. This reaction and its consequent beneficial effect on cardiac filling can be supplemented even in rapid acceleration by wearing a pressure G suit.

O. H. GAUER (Germany) recalled that a large human centrifuge capable of producing an acceleration of 4G was used over a hundred years ago at the Charité Hospital in Berlin in the treatment of mental disease, as a forerunner of shock treatment; sixty years ago a smaller device was used for the treatment of circulatory disorders; and about ninety years ago a human centrifuge was employed for physiological research.

A glimpse into the future, reminiscent of Jules Verne, was provided by J. GERATHEWOHL (U.S.A.) in a description of the human reactions to weightlessness. Flights in which subgravity or zero-gravity states reduce the effective weight of the individual to less than 5% can be expected to occur more commonly in the future. The effects have been studied in parabolic courses or steep dives at heights between 17,550 and 20,000 feet; the state lasted for 25–30 seconds during the parabolic flight and for about 15 seconds during a dive. Three main groups of sensation have been recorded. Most felt fine and enjoyed the state of weightlessness and the strange situation, including the changes of acceleration. Others did not observe adverse effects but experienced sensations of falling, rotation, or simply suspension in mid-air. Some, however, suffered from discomfort, nausea, and vertigo typical of motion sickness. It may be possible to select individuals who are particularly suited for weightlessness.

The Giraffe

R. H. GOETZ (South Africa) considered the peculiar problems of the giraffe in regulating its circulation and blood-pressure. By passing a catheter along the carotid artery into the base of the brain it was found that at this site the systolic blood-pressure was 200 mm. Hg; when the animal raised and lowered its head this pressure altered little, but there were changes in heart-rate and pulse-pressure. There are no special mechanisms in the heart to assist in maintaining the cerebral circulation, but the ventricular wall is immensely thick and those arteries which have to withstand the greatest hydrostatic pressure have powerful smooth muscle arranged in three distinct layers.

Acid Secretion by Stomach

E. J. CONWAY (Eire) said that the secretion of hydrochloric acid by the oxyntic cells of the gastric mucosa has often been regarded as a unique process, but, if the essential feature is taken to be the secretion of H ions in high concentration or relatively large amount, it is by no means unique.

B. UVNÄS (Sweden) mentioned the lack of accurate knowledge of the physiological and chemical properties of gastrin or of the way in which gastrin stimulates the gastric glands. There is a lack, too, of direct investigations of the manner in which known gastric secretogogues act and of the effects they may have on the production of gastrin. The apparently incompatible divergence of evidence regarding the possible relationships between nervous and gastric phases of secretion tends to obscure the main issue. This, Uvnäs believes, is not whether the antral part of the stomach is essential for the vagal secretion of hydrochloric acid, because vagal impulses can cause the secretion of acid in the absence of the antrum, but rather to what extent the antrum influences the course and extent of the nervous phase of secretion.

R. A. GREGORY reviewed the problems of inhibition of gastric-acid secretion. He distinguished between the effects of agents such as adrenaline, noradrenaline, and vasopressin, which cause vasoconstriction and probably owe their influence on gastric secretion to restriction of blood-supply to the glands, and other agents which, having no circulatory effects, probably interfere with secretion between excitation and the gland-cells. Inhibition can be observed only against the background of various kinds of stimulation each of which introduces conflicting additional factors; the purest form of stimulant is perhaps histamine, but it is doubtful how physiological a stimulant this is. There is some evidence for nervous inhibition. Although it is recognised that the ingestion of fat reduces gastric motility there is no clear indication that there is any accompanying humoral effect on secretion except when the initial rate of secretion is low. Urogastrone activity is associated with a protein-like substance of low molecular weight, possibly combined with pigment; but, because there is no satisfactory method of assaying this substance, it is difficult to judge its alleged effects. Gastric secretion is depressed by a rise in body-temperature; this effect follows 1–2 hours after the maximum rise in temperature induced by injection of purified bacterial pyrogen, suggesting that the effect on secretion may be due to some other process than the pyrogen or the vasoconstriction it induces.

K. M. BYKOV (U.S.S.R.) described recent work on the cortical control of gastric secretion by new experimental techniques devised to study gastric secretion. The results suggest that the main innervation of the gastric glands differs in different regions and that, although the whole process of secretion is due to integrated action, there are notable qualitative differences in nervous response to different substances placed in the stomach. Thus in a dog with two pouches, one on the lesser curvature, which is mainly supplied by the vagus, and another on the greater curvature, mainly supplied by the sympathetic, the ingestion of bread leads to vagal secretion and of milk to sympathetic secretion. These pouches also display differences in motor activity.

Special Articles

HELPING THE HOSPITALS

As the Guillebaud Committee pointed out, our hospitals still depend very largely on voluntary service, and there is scope for much more. Likewise the skilful use of voluntary contributions remains important for their development, and particularly for innovation. Thus in London the work of the King's Fund, instead of fading away with the coming of the National Health Service, has become steadily more valuable. Imagination linked to experience has achieved much that could not have been done officially yet is fundamental to the improvement of the service.

The Fund's latest report[1] is encouraging not only because it shows progress in these private efforts but also in its comment on what has been done by the hospitals themselves—despite their lack of money for major capital expenditure. The reports of the Fund's visitors show that the hospitals of the area "are in a fair way to overcome the arrears of maintenance and minor improvements that had accumulated since 1939.

"Indeed the reports of institutional appearance and lack of equipment are fast dying away. Many of the defects which seemed, to the Visitors of 1953, so unlikely to be eradicated without very great delay have been resolutely tackled and seem now to be reduced to manageable proportions in all but a few places. It is, too, encouraging to see that groups of Friends are springing up and although it is rare for any of them to raise large sums, they provide amenities in

1. Fifty-ninth annual report of King Edward's Hospital Fund for London, 10, Old Jewry, London, E.C.2.

kind and by personal action, which do much to help the patients."

Last summer, in setting aside £250,000 for grants to mental and mental-deficiency hospitals in the three years 1955–57 the Fund opened a new chapter in its activities. Until 1948 the mental hospitals, since they belonged to the local authorities, lay outside its scope; but in the past seven years it has acquired first-hand knowledge of the 36 large ones round London. Obviously the necessary adaptation of the old buildings was a problem of such magnitude that the Fund could offer no more than pointers to its solution; but among the projects mentioned to it were two or three that seemed to offer real promise for the future.

"Thus at Warlingham Park, a hospital which has become widely known for its progressive policies, Dr. T. P. Rees outlined his conception of a building which would help to gather the scattered dormitory and day-room blocks into something more like a village community and provide a focal point, where patients might congregate naturally whenever opportunity offered. Dr. Rees' graphic conception of the kind of social or community centre for which he would like to stipulate in any mental hospital thus offers hope of evolving a model scheme, which if adopted elsewhere might go a long way towards remedying a failing inherent in practically all mental hospitals. Similarly at Goodmayes Hospital, Dr. G. Somerville was impressed with the need for a new approach to the various activities which should together make up occupation therapy in the widest sense—a more constructive approach, with much more adaptation of occupations to the needs of normal life."

At Goodmayes there is to be a new kind of occupation centre, and Warlingham Park is to have a social centre with shops, hairdresser, bank, library, and café for patients, visitors, and staff—both projects to be opened probably next year. In addition, at Bromley a house has been bought to serve as a community centre and day hospital to work with the psychiatric outpatient department of a general hospital.

Besides trying to improve catering in mental hospitals,[2] for which £50,000 has been set aside, the Fund is maintaining contact with the mental hospitals through its three staff colleges. Special courses have been arranged for matrons and chief male nurses, and for sisters and charge nurses, which have provided "stimulus of a kind that can only be obtained by seeing for oneself what is going on elsewhere." Other courses are being planned for secretaries of mental-hospital management committees, and a proposal has been made for a course in which medical superintendents and their deputies might participate and enjoy the opportunities afforded by the Administrative Staff College for discussion and exchange of opinion. "Taken together these courses seem to hold out the possibility of much enhanced coöperation between doctors, nurses and administrators and between one hospital and another in making the adjustments needed today."

Among many other schemes, a word may be said about the special service now known as Hospital Personal Aid Service for the Elderly, under which visiting is now carried out in fifteen hospital groups. Its chief objects are:

To keep waiting-lists "live" by removing names of those who have died, recovered, or left the district, and any others whose changes of circumstances have not been reported to the hospital.

To look for, and (with the agreement of the hospital) to arrange, alternatives to admission wherever possible.

To suggest to the hospital the degree of priority of admission based on social grounds.

At one hospital whose waiting-list had not fallen below 110 for a very long time, visiting showed that 81 patients had died or had already been admitted elsewhere. Alternative arrangements were made for 24 others, leaving 5 patients who needed admission and for whom beds were found within a fortnight.

2. Hawes, D. G. H. *Lancet*, 1955, i, 1214.

EXPLOSIONS IN THE OPERATING-THEATRE

In August, 1953, the Ministry of Health appointed a working party, under the chairmanship of Prof. Gilbert Stead, to examine the question of anæsthetic explosions. The working party's report[1] was published last week.

After considering the history of 36 explosions which took place between the middle of 1947 and the middle of 1954, the working party were impressed by the fact that almost always there had been some avoidable factor against which precautions can be taken. One of the chief difficulties to be overcome was the lack of any general consciousness of danger. If every hospital would take simple precautions, the report declares, of the type already observed as a routine wherever any thought has been given to this matter, "three-quarters of the problem of anæsthetic explosions would disappear."

Most of the explosions were probably caused by static sparks. It is hard to ensure that conditions are always such that a dangerous static discharge is absolutely impossible. But, if simple precautions are taken, explosions are very rare.

Rubber equipment.—Most explosions could be directly attributed to the use of non-conducting rubber. The working party hope that the introduction of anti-static rubber will shortly be followed by a decline in the number of explosions and above all of deaths caused by static discharges. It has been suggested that the anti-static rubber equipment at present available is not uniformly satisfactory; and this is being investigated. The working party very strongly recommend that as soon as the Ministry is satisfied that a reasonable standard has been attained, hospitals should be urged to re-equip their theatres without delay. Re-equipment should not wait until existing equipment is worn out. This is not, the report remarks, an expensive item in hospitals' budgets, and "in our view the early universal introduction of anti-static rubber is the most urgent step towards the solution of the problems referred to us."

Clothing.—The chief danger is non-conducting footwear, which increases the risk of personal electrification and also prevents rapid discharge from the wearer to the ground. The best kinds of footwear are shoes or boots with soles and heels of anti-static rubber or overshoes of an anti-static fabric completely enclosing the normal footwear. Everybody in the theatre should wear a close-fitting gown of anti-static fabric (e.g., cotton, linen, or viscose rayon) tied closely enough to reduce the generation of charges on the clothes beneath. Woollen blankets may be readily electrified and are very dangerous in the theatre.

Floors.—The Ministry has already issued[2] to hospitals suggestions about the degree of resistance which should be aimed at for floors and about some suitable types of floor. The working party agree with these suggestions, and they go on to consider how existing floors in theatre suites, &c., which are of highly resistant material such as rubber or cork, can be made safe for the use of explosive anæsthetics. Probably 5–10% of operating-theatres in this country have floors which are virtually non-conducting. When a non-conducting floor is used only occasionally for procedures with explosive anæsthetics, the simplest and safest course is to damp the floor. When the floor has a non-hygroscopic surface and the effect of damping the floor itself is very temporary, a damp sheet should be put down. When explosive anæsthetics are to be used frequently, some more permanent method is clearly desirable; and at present the only complete remedy is to lay a new floor. But there are other possibilities awaiting

1. Report of a Working Party on Anæsthetic Explosions, including Safety Code for Equipment and Installations. H.M. Stationery Office, 1956. Pp. 39. 2*s.* 6*d.*

2. R.H.B. (53) 55.

exploration, such as washing the floor with a suitable solution or painting it with some form of conductive coating.

Relative humidity.—High relative humidity is in some ways the best of all measures to reduce the dangers of a static discharge. A high proportion of accidents occur during abnormally dry weather. Every anæsthetising location should be equipped with some simple instrument to measure relative humidity; and there should be some means of raising the humidity when necessary. It should be the responsibility of the theatre sister or some other member of the staff to inform the anæsthetist as soon as relative humidity falls below 50%. The raising of humidity is not as simple as might be imagined. Washing down walls and floors with water has some effect, but not as much as might be expected. An ordinary spray washer might be of use for raising humidity, and there are a few special types of apparatus available for this purpose, some of which might be suitable for hospitals. But further research should be undertaken before hospitals can be advised how best they can prevent low humidity.

The report also mentions an apparatus which ionises the air so that charges are quickly dissipated. The working party would like to see further investigation both of the machine's efficiency as an anti-static device and of the possibility of harmful effects from breathing ionised air.

The only complete answer would be one which freed the anæsthetist from the necessity of using medically unsuitable drugs to avoid explosions. This can only be done by offering the anæsthetist a sufficient range of medically suitable non-explosive gases. One possibility lies in fluorine-substituted compounds analogous to existing anæsthetics. In recent months, a "snuffer" for petrol has been found—that is, a substance which, when added to petrol, renders it non-inflammable. It is worth immediate investigation whether this or another substance will do the same to ether and other explosive gases. Finally, the properties of xenon as an anæsthetic deserve further attention.

The report ends by re-emphasising the need for a more general awareness of this danger. Anæsthetists should not need to be reminded that they must not smoke at their work, nor hospital authorities that they must not put gas burners anywhere near a place where inflammable anæsthetics are used. But they do, the report says; "and until some consciousness of the danger can be engendered there is little to be gained by refinements in technique." An appendix to the report gives a draft for a warning notice which might help to make the dangers plain. Another appendix sets out a safety code for equipment and installations to be used in conjunction with explosive anæsthetics.

Public Health

Poliomyelitis

IN the week ended Aug. 4 uncorrected notifications of poliomyelitis in England and Wales were as follows: paralytic 73 (71), non-paralytic 58 (89); total 131 (160). This is a decrease of 29 compared with the previous week, the figures for which are in parentheses.

Reinoculation against Enteric Fever

In the Army reinoculation against enteric fever is in future to be done intradermally and not, as hitherto, subcutaneously. Announcing this, the War Office points out that intradermal inoculation is less liable than subcutaneous inoculation to be followed by temporary disability. The decision has been taken in the light of evidence from the U.S.A. and of experimental findings at the David Bruce Laboratories (Army vaccine laboratories) at East Everleigh, near Marlborough, Wilts.

In England Now

A Running Commentary by Peripatetic Correspondents

OUR party on several evenings this summer has consisted of a highly respected solicitor of middle years, an architect of more middle years though young at heart, an exceedingly high dignitary of the Church, who came as spectator only, and your peripatetic correspondent, to give balance to the group. We are a motley crew dressed in our oldest clothes.

Arriving at our destination, our first act is to unroll on the ground a large white sheet, over which we place a tripod supporting a large and powerful lamp. Next comes the really hard work of the evening, when the 150-lb. generator is lifted from the boot of the car. Usually it starts readily and the quartz-tube of the mercury-vapour lamp begins to glow, dimly at first but with increasing power as it warms up, so that in ten minutes there is a dazzling glare over the sheet, and all members of the party take on a dusky cyanotic tinge. Almost at once the moths begin to arrive and settle on the sheet or, more often, perform a dizzy tarantella on it, round the lamp, out into the darkness again, back to the sheet, up a trouser leg, and down a neck. Not moths alone are attracted to the long-wave ultraviolet radiation: there are also hosts of midges. But moths are the main game, and first to come are members of the primitive family of swifts or Hepialidæ. A warm muggy night brings many species—delicate geometers (so-called from the looping gait of the caterpillars, a form of progress which leads our transatlantic confrères to call them "spanners"); burly prominents, most familiar of which is the puss moth; and dingy (very often) noctuids, known more picturesquely in the past variously as "owlets," "buzzards," or "millers." The arrival of the brilliant green of the large emerald or the equally brilliant black-and-vermilion of the cinnabar moths means that the night is well advanced. All moths seem to have their special time of flight during the night, and in summer most seem to favour the time after midnight.

In due season beetles and other insects visit the sheet—in May the familiar cockchafer is a blundering but rather likeable menace. Much less welcome are the rather disgusting sexton beetles, which are usually a crawling mass of bright red mites, and when disturbed emit a fœtid fluid.

The paling sky in the north-east reminds me that in a few hours there will be a crowd waiting in surgery. But on a good night in June or July one may see over a hundred different species of moths, and there are many compensations for the loss of sleep.

* * *

Rosalind, toddled unsteadily into the dining-room, swiped my napkin from my knees, and, in a voice charged with the dilated excitement of infants for the absolutely prosaic, cried "Moo!" After she had delivered herself of this apocalyptic message, she weaved her way back to the hall.

"Isn't she *cute*," said my wife, "it's the cows in the field, you know."

"Brilliant!"

Mealtime should be a time of holy quiet, where appetite is stimulated, hunger assuaged, and the ill-temper which accompanies hunger gradually allowed to retreat before the benediction of good food. Unless there is a lot of time to spare eating is best conducted without conversation—at least for the first two courses. What did the psalmist say? "Better a morsel in peace . . ." The thought was interrupted by the agitated return of Rosalind from her recent recce. I put my napkin on the table. She plunged her hand into my trouser-pocket and took my keys.

"Moo, den," she cried.

"She can see the cow over the garden-fence," interpreted my wife, "that child has a most penetrating mind. I don't think you realise that she is only twelve months old."

"My dear girl, I have told you I think she is brilliant . . . scintillating . . . pure spirit."

My wife is blinded by affection. She will not see that all our kids are *devastatingly* average: as for Rosalind,

she is, if anything, rather dull . . . inclined to be backward: The object of my disregard suddenly swung round the door and yelled:

"Moo, den, dor."

"She can see the cow over the garden-fence from the front door, dear! That child amazes me. Twelve months! Mrs. Fitzsimmons thought she was very forward. Ronnie, I do think you could show a little more interest. After all she is trying to *tell* you something."

"I will show more than interest" I said, rising from my half-finished meal. "I shall take her myself to see the moo's!"

I took my daughter by the hand, and, with what I hoped my wife would recognise as the blistering sarcasm of a tired and famished man, I said, "Moo, den, dor?" Rosalind, now wreathed in smiles, pulled me towards the hall.

I was somewhat suprised to see a cow in the vestibule. It was eating, with evident relish, the clematis which I had trained over the porch.

* * *

Although she never admitted spending any part of her honeymoon in Tralee, I am certain that my mother must have been chased by a chimpanzee around the time when she was dealing out the genes in my fœtal chromosomes. There can be no other explanation for my hirsute prejudices. Heredity was soon reinforced by environment. The earliest searing memory of a separate existence was the impaling of my infant cheek on the iron-grey stubble of a bearded aunt, like a fakir on a bed of nails, denied either the mental preparation and solace of Yogi, or the blessing of a powder-puff between us. Wild horses could not drag sixpence from me to see another one in a circus.

With the proud surge of hormones came a new tolerance to certain auburn pigtails, and a corresponding display-reaction to sprout a beard. The product looked so tatty that the pigtails revolted, and that was how I acquired my unshakable conviction that all my bearded fellow men are vulgar exhibitionists, probably unclean in their habits, and politically unreliable. Sideboard appendages fall into two distinct categories. With round-shouldered tweeds and ancient brogues they mark the stick-in-the-mud romantic relics, the neo-squirearchy of England, simple and trusting. Over padded acromia and patent-leather pointed toe-caps they advertise the not-so-simple and the never-trusting spivs and renegades. No, Sir, both beards and sideboards are out with me. Not for white men, Sir, not cricket.

I feel much less bigoted about moustaches and the rest of facial adornment. Luxuriant handlebars conjure visions of bombers, cans of ale, and lashings of bonhomie. The toothbrush is a neat reflection of obsessional neurosis, the drooping walrus a signal of incipient depression, the waxed pointers towards hyperpiesia, the eleven-a-side suggests the vanity of callow Continental narcissi. I rather envy the masked headlamp effect of beetling shaggy eyebrows to match the Detroit-line fashion in our newer motor-cars, the porcupine aggressiveness of spiky external nares, the Constance Spry effect of cactus-filled auditory meati. Still in the realm of pure decoration, I wish that hairy chests did not vaunt their virility with so much crackling under the stethoscope; I wish that sandpapered legs felt more like legs and less like sandpaper once the nylons peel off.

Obviously there can be only one acceptable male hair style: one's own. I applaud the hygiene of the crew-cut but not its implied mental emigration. I view with distaste the flopping forelocks of the pimply adolescent, the crimped perms of sham Edwardia, the dandy foppishness of lateral waves below the bowler hats, the curls over the collar, the flourish of a comb from the pocket for public preening and patting. Short at the back and sides it was in my day, and no messing about. I said so once more over breakfast this morning. "Fiddlesticks!" mocked my wife, "From the look of you, it's more likely your mother was chased by a coot."

* * *

Patient (anxious to help): "The doctor told the students I had got an apex beat. Another doctor said my ticker had gone west and instead of making blood was making water."

Letters to the Editor

THE UNRECOGNISABLE TABLET

SIR,—I was required recently to explain to an official of the Ministry of Health why my percentage of proprietary prescribing was unduly high, compared to my area as a whole. My reply was that, whenever these drugs were comparable in price, I preferred to use a distinctive preparation which could easily be identified by my partner or myself—and, not least, by the patient. I have not infrequently been asked by patients, whom I have seen for other doctors, to identify three or four packets of nondescript tablets, among which might be digoxin or butobarbitone. Often one feels they must be thrown away for safety, with consequent waste.

The last experience I had, which prompts this letter, is of writing a prescription at the Matron's request for a child in a convalescent home. The child suffered from asthma and petit mal, and had run out of its supply of phenobarbitone and ephedrine tablets, which (given when need arose from certain symptoms) controlled the attacks. The small quantity of both tablets, prescribed p.r.n., arrived back from the local chemist in two identical white cardboard boxes, with no clue as to which of the exactly similar small white tablets "as required" were which. In desperation, the Matron took the tablets back to the chemist, who was reduced to analysis before he could tell her which were for asthma and which for fits.

I still feel there is a lot to be said for the "pink" sleeping-tablet, the multicoloured capsule, and the greenish-orangy mixture, and I should welcome the support of those of my colleagues who feel that plain white tablets can be both wasteful and dangerous. Even a single numeral can be, and often is, a vital clue.

Walmer, Kent. JAMES S. HALL.

CALORIE INTAKE IN RELATION TO BODY-WEIGHT CHANGES

SIR,—The article by Professor Kekwick and Dr. Pawan (July 28) will have been read with interest. The effects of dietary composition on energy metabolism and on gain or loss of weight are a little-explored field and new knowledge is undoubtedly emerging. Although the authors themselves do not draw any practical conclusions from their work, I believe it is desirable to emphasise that at the present time there are no good grounds for concluding that obesity should be treated with high-fat diets.

Periods of seven to nine days are very short for studying changes of weight in obesity. Apart from fluctuations from unascertainable causes, which may be considerable,[1,2] previous experience of changes in weight following alterations of diet suggests that changes other than those due to the calorie level are transient[3–6]; after a varying length of time the weight becomes steady at a new level. There seems to be no evidence so far that high-fat or other specially constituted diets can cause a continuing loss of weight, over and above any loss that would be predicted from the calorie level of the diet. Pennington has advocated unrestricted-calorie, high-fat, diets for treating obesity, but has apparently only achieved moderate losses of weight followed by stabilisation at a new level.[7–9] The effect must be shown to persist before there can be any suggestion of using such diets to obtain worth-while losses of weight in obese patients.

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2. Widdowson, E. M., McCance, R. A. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1954, no. 287.
3. Newburgh, L. H., Johnston, M. W. *J. clin. Invest.* 1930, **8**, 197.
4. Lyon, D. M., Dunlop, D. M. *Quart. J. Med.* 1932, **25**, 331.
5. Anderson, A. B. *Ibid*, 1944, **37**, 27.
6. Dole, V. P., Dahl, L. K., Schwartz, I. L., Cotzias, G. C., Thaysen, J. H., Harris, C. *J. clin. Invest.* 1953, **32**, 185.
7. Pennington, A. W. *Industr. Med.* 1949, **18**, 259.
8. Pennington, A. W. *Delaware St. med. J.* 1951, **23**, 79.
9. *Lancet*, 1954, i, 144.

Most people would agree that in an obese person reduction of weight, to be effective therapy, must involve removal of fat, as opposed to water and salts. Obesity and œdema are essentially distinct conditions, though they may occasionally co-exist. Newburgh [3] believed that the changes of weight he observed after changes in dietary composition were entirely due to water. Kekwick and Pawan estimated from measurements of total body-water that 50–70% of their losses of weight were due to fat. It is, however, very difficult to measure total body-water with sufficient accuracy to establish this, and it appears from their data that the striking increase in insensible water loss which they observed would by itself account for 70% of the weight lost on the high fat and protein diets—the intake of water being constant in these experiments. Urine losses were not measured, but carbohydrate diets are known to give minimum urine volumes. One has only to suppose the urine volumes to have been greater by 100 ml. per day on the fat and protein diets to account for the whole loss of weight in terms of water.

A high percentage of fat in the diet may in some way stimulate metabolism, but I do not think that such an effect has as yet been convincingly demonstrated; we are a very long way from being able to put it to practical application.

Medical Research Council Department of Experimental Medicine, Cambridge. G. R. HERVEY.

SIR,—The extremely interesting article by Professor Kekwick and Dr. Pawan justifies the clinical practice of basing diets for obesity on reduction of carbohydrate rather than on reduction of calories and fat. But the effectiveness of such high-calorie high-fat diets will remain surprising so long as body-fat continues to be regarded merely as an inert mass of stored fat and not as a highly active organ, the "fat-organ," comparable to the liver.[10–12]

The "fat-organ" is concerned especially with the metabolism of carbohydrates from which it synthesises first glycogen and then fat. On a diet devoid of carbohydrate no fat is synthesised however large the intake of calories. Indeed a high-fat diet appears to depress synthesis,[10] and there appears to be no evidence that dietetic fat can add to the total fat in the "fat-organ" except during recovery from starvation. In other words the "fat-organ" can only become obese through synthesising its fat from carbohydrate.

A theory which accounts for most of the problems of obesity is that the normal "fat-organ" removes carbohydrate circulating in the blood after a carbohydrate meal and converts it to fat which is then discharged back into the blood in the form of lipomicrons. These and those from dietetic fat, since they cannot be stored to any extent, must be burnt by the body. Hence people with a normal "fat-organ" are forced to increase their metabolism to balance an increased calorie intake. This explains why the weight of many people remains constant for years though they do not consciously control their consumption of food, and it also explains how some people can eat twice as much as others while not being appreciably fatter or more active. Further the increased metabolism, postulated by Kekwick and Pawan as occurring when obese patients are given a high-fat and high-calorie diet yet lose weight, is seen to be due to the necessity which all people including the obese have to metabolise and not to store dietetic fat. On the other hand when for any reason—probably endocrine—fat continues to be synthesised normally from carbohydrate by the "fat-organ" but is not completely discharged into the blood, the body then and only then becomes obese.

To treat obesity, therefore, by a low-calorie diet or by a drug which destroys appetite is not treating the fundamental derangement of the "fat-organ" but is merely subjecting the whole body to the injurious effects of starvation. Conversely a diet without any reduction in calories but very low in carbohydrate removes the stimulus to the "fat-organ" to make fat, without injuring or fatiguing it or the rest of the body. Of course thus preventing the synthesis of fat fails to cure the true cause of obesity, the inability of the "fat-organ" to discharge fat. But the obesity or thinness associated with many endocrine disorders holds out the hope that this inability of the "fat-organ" will be found to be due to a controllable endocrine disease requiring no special diet.

London, W.1. FRANKLIN BICKNELL.

10. Tuerkischer, E., Wertheimer, E. *J. Physiol.* 1942, **100**, 385.
11. Wertheimer, E. *Ibid*, 1945, **103**, 359.
12. Wells, H. G. *J. Amer. med. Ass.* 1940, **114**, 2177.

HEALTH CENTRE OR GROUP PRACTICE?

SIR,—I was very interested in your references (Aug. 4) to the report on health centres of the London Local Medical Committee, and I feel that it is a great pity that the authors did not find time to send some representatives down to the William Budd Health Centre to see for themselves how it was working. They would have found that what they are now recommending we have been practising as a routine for the past three years in this health centre. From our experience we can endorse wholeheartedly their recommendations.

They would have found a modest building in which doctors are consulted over all staff appointments, where they work in close coöperation with the local-health-authority workers who use the consulting-room suites in the afternoons, and where the doctors hold their own infant-welfare and antenatal sessions. Despite the absence of any partnership agreements, doctors *do* see each others' patients in emergency and call each other into consultation over interesting or puzzling cases. This is a local-health-authority venture, and I cannot speak too highly of the help and encouragement we have had from the Bristol local health authority, especially the medical officer of health.

In my opinion, the only intelligent method of conducting general practice these days, under the National Health Service, is from a health centre such as the William Budd, for it is only in this way that our full potentialities in the realm of preventive medicine—surely our ultimate aim—can be realised.

William Budd Health Centre, Bristol. J. SLUGLETT Chairman, House Committee.

X RAYS AND LUNG CANCER

SIR,—As one who for twenty years has thought that lung cancer might be related to tobacco-smoking, may I draw attention to another potential cause of this disease? Year by year the curve of incidence of lung cancer has been drawing away from the curve of tobacco consumption; and we should do well to look for some other possible factor which has been increasing.

Berenblum and Shubik [1] have demonstrated a two-stage mechanism of carcinogenesis whereby a co-carcinogen (shall we say, in tobacco tar) may cause a latent change in a cell, after which a small amount of a second agent (another constituent of tobacco, or X rays?) causes the cancer to develop. Granted the carcinogenic action of tobacco, may not the spectacular increase in incidence of lung cancer *over recent years* be due to the additive effect of X rays, themselves known to be carcinogenic? The relatively high incidence of leukæmia in radiologists is ascribed to their occupational exposure to X rays.[2]

Twenty years ago, it was rare to meet a person who had been X-rayed, but now it is hard to find one who has not. Moreover, most of them have had X rays through one area—the lungs. Perhaps, too, it is significant that smokers, because of their greater tendency to bronchitis, tend to undergo more X-ray examinations than non-smokers.

Oxford. H. S. BURTON.

1. Berenblum, I., Shubik, P. *Brit. J. Cancer*, 1949, **3**, 109, 384.
2. Peller, S., Pick, P. *J. Amer. med. Ass.* 1951, **147**, 893. Sturgis, C. C. *Ibid*, 1952, **150**, 1551. March, H. C. *Amer. J. med. Sci.* 1950, **220**, 282.

PRENATAL IDENTIFICATION OF BLOOD-GROUP ANTIGENS

SIR,—The prenatal diagnosis of fœtal characters has considerable medical potentialities. The practicability of such diagnosis was first realised when the sex was correctly diagnosed before birth by examination of amniotic-fluid cells.[1–7] It has been shown that the fluid can be safely obtained from the 12th week of pregnancy [8 9] when it already contains suitable cells.[1 2 10] Such early diagnosis is obviously of value in certain sex-linked abnormalities.

The introduction by Coombs et al.[11] of an elegant technique for detecting blood-group antigens on epidermal cells, by specific mixed agglutination, has opened up the possibility of using amniotic-fluid cells for the diagnosis of fœtal antigens.[12 13] This could have the value [13] of an early diagnosis of blood-group incompatibility, and it would be essential for early diagnosis of abnormalities genetically linked to an antigen. This technique could also be used for a study of the appearance of antigens during development.

In order to test whether amniotic-fluid cells are suitable for these purposes, we have examined such cells, obtained prior to delivery and from 11-week and 18-week aborted fœtuses, for their ability to give the mixed agglutination reaction for the A and B antigens.

The procedure for demonstrating mixed-cell agglutination that we have followed is almost identical to that developed by Coombs et al.[11] This procedure is based on the premise [11] that the agglutinating antibodies are at least bivalent, so that if, for instance, the epithelial cells and erythrocytes both have B antigen, anti-B antibodies can be specifically linked to both types of cells. If cells with an unknown antigen are treated with different blood-group antisera and then mixed with erythrocytes whose antigens are known, the type of erythrocyte that will attach itself to the cell will indicate its antigenic constitution. The existence of a specific mixed agglutination therefore shows the presence of a common antigen on the erythrocytes and the epithelial-cell membrane, whereas the absence of such an agglutination shows that the antigens are different.

Our results show that amniotic-fluid cells can give the mixed agglutination reaction (see figure), although not all the cells seem to participate. Fuchs et al.[14] have independently come to the same conclusion for cases prior to delivery. There is a considerable proportion of pyknotic cells in the amniotic fluid (an average of 12% of the cells were suitable for the diagnosis of sex in fluid obtained from the sixth month onwards [10]) and the more degenerate cells may no longer give the reaction. The accuracy of the reaction was checked by the postnatal typing of blood from the umbilical cord in the cases tested prior to delivery, and by the typing of erythrocytes taken from the 11-week and 18-week fœtuses.

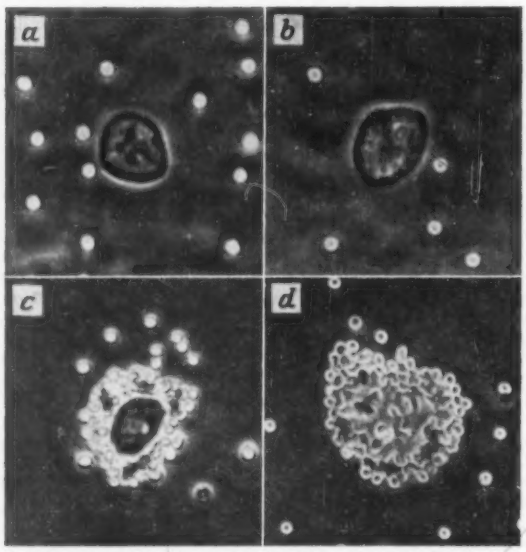
We have thus shown that, even at the earliest stage when fluid can be obtained during pregnancy, amniotic-fluid cells can be used for identification of fœtal antigens of the ABO group. It can be presumed that it will be possible to use these cells to identify any antigen that can be diagnosed on epithelial tissues. One can therefore now consider practical applications of prenatal diagnosis of fœtal antigens.

We are indebted to Dr. A. Cohen, Dr. Y. Muhlenthaler, and Dr. I. Ziluf, for obtaining the amniotic fluid.

LEO SACHS
MICHAEL FELDMAN
MATHILDE DANON.

Weizmann Institute of Science,
Rehovoth, Israel.

1. Serr, D. M., Sachs, L., Danon, M. *Bull. Res. Coun. Israel*, 1955, **5B**, 137.
2. Sachs, L., Serr, D. M., Danon, M. *Science*, 1956, **123**, 548.
3. Fuchs, F., Riis, P. *Nature, Lond.* 1956, **177**, 330.
4. Shettles, L. B. *Amer. J. Obstet. Gynec.* 1956, **71**, 834.
5. Makowski, E. L., Prem, K. A., Kaiser, I. H. *Science*, 1956, **123**, 542.
6. James, F. *Lancet*, 1956, i, 202.
7. Dewhurst, C. J. *Ibid*, p. 471.
8. Dieckmann, W. J., Davies, M. E. *Amer. J. Obstet. Gynec.* 1933, **25**, 623.
9. Alvarez, H., Caldeyro, R. *Surg. Gynec. Obstet.* 1950, **91**, 1.
10. Sachs, L., Serr, D. M., Danon, M. *Brit. med. J.* (in the press).
11. Coombs, R. R. A., Bedford, D., Rouillard, L. M. *Lancet*, 1956, i, 461.
12. Edwards, J. H. *Ibid*, p. 579.
13. Sachs, L., Danon, M. *Ibid*, p. 1013.



Phase-contrast photomicrograph (× 500) of amniotic-fluid cells: *a* and *b*, from 18-week old fœtus with B antigen, treated with anti-A serum and A erythrocytes, showing no mixed agglutination; *c* and *d*, from 11-week fœtus with B antigen, treated with anti-B serum and B erythrocytes, showing mixed agglutination.

C.N.S. LESIONS AND THE ŒSOPHAGUS

SIR,—I was particularly interested in your annotation of July 7 because I had just had to deal with a patient who presented to me with bulbar weakness with paralysis of the palate and of the muscles of deglutition, and who, in addition, had a large hæmatemesis. The diagnosis of bulbar poliomyelitis was assumed but not proven.

The patient was a 28-year-old Naval officer whose illness began on July 5 with a left-sided follicular tonsillitis. He was treated, at another hospital, with a 5-day course of penicillin and made a good response clinically. On the evening of July 9 he felt unwell. On the 10th he was noted to have left palatal weakness and he had some difficulty in swallowing. His temperature at this stage was rising, and he was transferred to this hospital with the provisional diagnosis of bulbar poliomyelitis.

Since there was no respiratory weakness he was nursed in the prone and semi-prone head-down positions with frequent mouth toilet and suction. He was tube-fed. 16 hours after admission he had a hæmatemesis, which caused some alarm to the patient and his attendants, because of the risk of blocking of the air-passages, but with vigilant attention these were kept clear.

His general condition became gradually worse and his temperature rose to 104°F. Smaller hæmatemeses occurred during the ensuing hours and 10 hours after the first he vomited 8 oz. of altered blood. Immediately after this he collapsed and became unconscious. Replacement of fluids was given by, first, plasma and then blood-transfusion; but, although the patient's collapse was reversed, he did not regain consciousness. His temperature soon reached 106·8°F and it was clear that the higher centres were involved. His respirations were becoming weaker and at this stage a cuffed endotracheal tube was inserted and intermittent positive-pressure respiration was given with the Beaver apparatus. Death ensued 39 hours after admission to this hospital. The

14. Fuchs, F., Freiesleben, E., Knudsen, E. E., Riis, P. *Ibid*, p. 996.

diagnosis of poliomyelitis was thought to be the most likely in view of the onset and the (at first) purely bulbar involvement. The cerebrospinal fluid had shown 12 cells per c.mm. and a protein of 80 mg. per 100 ml.

At post-mortem examination, 6 hours after death, the brain and brain-stem were found to be excessively soft, the veins were engorged, and there were numerous petechial hæmorrhages in the cerebrum. The brain-stem was retained intact for histological examination. The stomach was thin-walled and dilated and there was an acute erosion measuring 2 × 1 cm. near the pylorus. This was thought to be the site of the bleeding.

I have seen several deaths from this type of illness but I have never seen it complicated by hæmatemesis. I have not yet had time to study the literature quoted in your annotation, but I offer this letter in the hope that the report of this case may help to elucidate an interesting problem.

David Bruce Military Hospital, British Forces Post Office 51. R. G. MACFARLANE.

PSYCHOTHERAPY IN ULCERATIVE COLITIS

SIR,—As a sufferer from ulcerative colitis, I was much interested in Dr. Paulley's paper of Aug. 4. I am surprised at his belief that he has improved the situation if the patient comes to him with a letter from the landlord instead of blaming the blackberry pie. What is gained by a different attribution, if the nervous tension is still to result in recurrence of the complaint? My own view of an improved situation is for the patient not to come to the doctor at all—that is, if Dr. Paulley is right in regarding the emotional state as solely to blame.

Though I accept the necessity for emotional release and control, I do not think it necessarily true that the colitis personality wishes to dodge the fight and to have a soft security. During his illness, the colitis victim, like any other sick person, needs protection; but he does not need to cling to his crutches. If, when he is in good health, he happily says boo to geese, then a doctor who insists on believing him "gutless," and tries to put him in an emotional padded cell, may do serious harm. Personally I have deeply resented efforts to turn me into a permanent invalid who cannot be "crossed." I would rather be confined to a bland diet than to a bland existence.

X.Y.Z.

POLIOMYELITIS: PROTEST FROM CORK

SIR,—In view of the wide publicity caused by the B.B.C. broadcast of Aug. 9, in relation to a seaman who travelled from Cork to Liverpool on s.s. *Glengariffe* on Saturday, Aug. 4, and was found on arrival to be suffering from poliomyelitis, the impression has been created that this case was badly missed by the public-health authorities here. In fairness to this department, therefore, I would be grateful if you would afford me the opportunity of stating the following facts:

On July 29 the seaman in question was in Glasgow. He was suffering from sore throat and consulted a practitioner in that city. He was told, I am informed, that he had laryngitis and could carry on his occupation. His ship, M.V. *Birchfield*, left Glasgow on July 30 and put into Whitehaven on the 31st. It arrived in Cork on Aug. 2 and remained here until the 4th when it sailed for Dublin. During its stay in Cork the sailor certainly consulted a practitioner and was, I believe, informed that he was suffering from the effects of either "slipped disc or fibrositis." In view of the circumstances the master requested that he be taken from Cork to Liverpool by the *Glengariffe* and this was granted.

The first I heard of this case was in the early afternoon of Thursday, Aug. 9, when I received a letter from Dr. J. B. O'Regan, city medical officer, Dublin, in which he recorded the essential facts as reported to him by Dr. John Walker, port medical officer, Dublin. By that time the B.B.C. broadcast had been on the air and in a very short time inquiries were being received from newspapers both in this country and in Great Britain.

I do not wish to be taken as criticising those responsible for the broadcast which, in the circumstances, was thoroughly justified. I merely wish to dissipate the impression that has gone abroad that the Cork health authorities have slipped up on this case. If I had had any idea of what was happening the patient would certainly not have undergone the ordeal of that journey from Cork to Liverpool.

I take the opportunity of expressing my appreciation of the help afforded me by Dr. A. B. Christie, medical superintendent of the Fazakerley Hospital, and of the two colleagues mentioned, in elucidating the essential facts of this incident.

I would further ask your hospitality to enter a protest against the exaggerated newspaper notoriety afforded to the poliomyelitis epidemic here. The total number of cases recorded to date from June 1 amounts to 91. Amongst these there has been 1 death, giving a fatality-rate of 0·9%. There has been no indication so far of any change in trend, and the proportion of non-paralytic cases remains about 52%. In these circumstances I think it is likely that this epidemic will go down as one of the mildest on record. Meanwhile a state bordering on mass panic has been engendered among the people of this city which reflects no credit on the newspapers concerned. This criticism does not apply to Irish newspapers only.

City Hall, Cork. J. C. SAUNDERS
City Medical Officer.

CANCER OF THE COLON

SIR,—We have read your leading article of June 16 with great interest and admiration. We also have a great deal of experience of double lesions of colonic carcinoma,[1] and recently we have seen a case of gastric carcinoma at two sites. These two lesions differed histologically: one was an epidermoid carcinoma and the other an adenocarcinoma.

University of Istanbul, Turkey. KÂZIM ISMAIL GÜRKAN
IMRAN HATIBOĞLU.

RECURRENT PULMONARY EMBOLISM

SIR,—I read with great interest the article by Dr. P. H. Davison and his colleagues (Aug. 4) on chronic cor pulmonale due to silent pulmonary embolism. At the present time I have under my care a patient with recurrent pulmonary embolism whose history is instructive and whose treatment raises a number of problems.

Aged 65, she had a fall last January and fractured her right femur. Two weeks after operation she developed "pulmonary congestion." A week later there were signs of a right femoral thrombosis, and anticoagulant therapy with phenindione ('Dindevan') was begun, the patient remaining in bed. Two weeks later she developed a femoral thrombosis in the other leg. A month after this last thrombosis phenindione was discontinued and she was walking a little on crutches.

She was seen two months later because she told her nurse that she had "intercostal neuralgia." The nurse had noticed that the patient had attacks of breathlessness with cyanosis of the lips which had become more frequent recently. On examination she was afebrile and there was a pleural rub at one base and a small patch of râles at the other base. There was no evidence of active phlebothrombosis, but both legs were œdematous and covered with a network of superficial venules as in Davison's second case. There was also marked cyanosis of the feet after a few minutes in the erect position.

Anticoagulant therapy was recommenced and the patient was encouraged to take as much exercise as possible. Three weeks later, when she was fully mobile, her prothrombin concentration rose from 10–20% to 70%. Auscultation revealed a patch of râles not present the previous day. On the following day a further patch appeared and she had a temperature of 99°F. Throughout this episode she was symptom-free.

The problem is to know how long to continue anticoagulant therapy, because, if treatment fails, chronic

1. *Bull. Soc. turq. Méd.* 1947, **13**, no. 7.

cor pulmonale will be the outcome. In previous cases I have treated, anticoagulant therapy was discontinued as soon as the patient was fully mobile, and only in those not fully mobile did further emboli occur. The dilated venules on the legs, the œdema, and the cyanosis of the feet continue to improve: does this indicate recanalisation of the deep veins? If so, perhaps anticoagulant therapy should be continued until maximal improvement has taken place in the legs.

There seems to be a good case in favour of ligation of the inferior vena cava, and this was being considered when the patient developed an active peptic ulcer. But the ulcer fortunately responded to medical measures, the patient remaining on anticoagulants.

Eastbourne. ANTHONY CHURCHER.

AMYOTONIA CONGENITA

SIR,—I read with great interest Dr. Walton's article.[1] I noticed with regret that he failed to include pathological discussion of the disease. His extensive clinical material might provide occasion for a study of the pathology. In my opinion such an investigation is especially important because in this ill-comprehended clinical syndrome only the anatomical findings could help in classifying the disease.

I should like to draw attention to a case[2] in which I found destruction of the anterior-horn cells of the spinal cord similar to that in progressive spinal muscular atrophy (Werdnig-Hoffmann type).

István Hospital,
Budapest, Hungary. T. LEHOCZKY.

HEAVY FEET IN THE WARD

SIR,—Miss Hutchinson, in her letter (Aug. 4), draws attention to the heavy-footed walking of nurses in hospital wards.

I have long known that a great many nurses do not know how to walk, but I never could do much about it. It is a disability which they share with a high proportion of modern city-dwellers. We have abolished cobblestones and we do not allow people to walk on the grass. It is assumed that all road and floor surfaces must be smooth and free from irregularities. If an accident can possibly be attributed to roughness in a floor there is likely to be an action for damages.

In such circumstances an organ so complicated as the human foot is not necessary, and many people use their feet as if they simply had hinge-joints at the ankle. The foot does not react well to the treatment and a great deal of trouble results.

It is quite difficult to walk well, but it must be very seldom that anyone is taught the art.

Liverpool. HENRY H. MACWILLIAM.

BURNS AND SCALDS

SIR,—Having followed with interest the discussion opened by your leader of May 19, may I recommend the treatment of burns and scalds with bile ointment? I use a cream containing the equivalent of 75% of deodorised fresh ox-bile,[3] and in my experience its effect on burns and wound infections has been striking. It appears to prevent further skin damage, limit the infection, and accelerate healing.

The beneficial effect of bile in these conditions, as clinically observed and suggested in my investigation,[4] is explained (*a*) by its bacteriolytic and bacteriostatic action against pathogens, (*b*) by its detoxifying action, and (*c*) by its being an essential co-enzyme factor in the tissues.

Alexandria, Egypt. NAJIB-FARAH.

1. Walton, J. N. *Lancet*, 1956, i, 1023.
2. Lehoczky, T. *Arch. Psychiat. Nervenkr.* 1924, **71**, 491
3. An ointment of this constitution is made under the name of 'Bylobalm' by Bylox Laboratories, Twyford, Berkshire.
4. Najib-Farah. *Acta med. scand.* 1956, suppl. no. 312, p. 596.

USE OF TRANQUILLISERS IN THE U.S.A.

SIR,—The publication (Aug. 4) of an extract from the American Psychiatric Association's warning on the abuse of these drugs is timely and generally applicable to this country. The casual use of tranquillisers for trifling emotional upsets is widespread among the public and needs control as they possess dangerous toxic and side effects. The cost of prescribing these preparations under the National Health Service is stated to be causing anxiety, and recently questions were addressed to the Minister of Health suggesting that they should be restricted to hospital practice.[1]

Three years' experience of these drugs has impressed me with their great potentialities in psychiatric practice, but they are definitely not a substitute for either electroconvulsive or deep insulin therapy. To avoid accidents or the risk of denying patients a more valuable remedy, practitioners would be wise to secure a specialist's opinion when they intend to employ these preparations. It would be a great pity if the pendulum was allowed to swing against these valuable drugs or we were limited in their prescription by reason of their excessive cost to the health service.

Wakefield. D. FENTON RUSSELL.

EARLY DIAGNOSIS OF BONE LESIONS

SIR,—In his letter of Aug. 4, Dr. Lack suggests that "Staphylococcal infection comes into the differential diagnosis, particularly of a lesion of the spine, and in doubtful cases it is worth measuring the staphylococcal antitoxin level of the patient's serum weekly for a few weeks." My own experience suggests that it is often not necessary to estimate the titre more than once, and in a report on staphylococcus toxoid,[2] I cited two cases in one of which the differentiation between a tuberculous and a staphylococcal lesion had been made on the basis of the very much raised blood titre. Following that, a number of other cases were similarly diagnosed, and in all of the cases *Staphylococcus aureus* was obtained from the lesion.

With the advent of penicillin this estimation appeared to fall into disuse, or rather it was never really much used; and it was interesting to see that it had now been found of value at the Royal National Orthopædic Hospital. I write only to emphasise that with the apparent increasing number of infections due to strains of staphylococci resistant to antibiotics, there may be an increase in bone lesions from this organism. In that case this diagnostic pointer would be well worth trying.

Kingston Hospital,
Kingston-upon-Thames, Surrey. D. STARK MURRAY.

ERYTHEMA NODOSUM AS A MANIFESTATION OF SARCOIDOSIS

SIR,—I have read with great interest the article (Aug. 4) by Dr. James, Dr. Thomson, and Dr. Willcox, for I had a similar case in general practice at the beginning of this year.

A very stout unmarried young woman, aged 24, presented herself to me one morning saying that she had a pain in her knee. On examination she was perfectly normal and extremely well, and the knee showed no localising signs. She was given a mild application and told to return in a couple of days if it did not improve. She came again next day saying that the pain had gone and she now had a pain in her wrist. By this time she had an undoubted erythema nodosum on both her legs. She insisted that she felt extremely well, her temperature and pulse were normal, there were no localising signs in any of the joints, and the heart and lungs appeared to be quite normal. But the erythrocyte-sedimentation rate (Westergren) was 90 mm. in one hour.

I made a provisional diagnosis of rheumatic fever and with great difficulty persuaded her to enter hospital, where she was treated as a rheumatic fever until chest X-ray showed

1. See *Lancet*, July 28, 1956, p. 207.
2. Murray, D. S. *Ibid*, 1935, i, 303.

sarcoidosis. Her serum-globulin was high initially. With time the E.S.R. dropped to 27 and the serum-protein reverted to normal, when she was sent home. Her E.S.R. still remains no less than 20, but she has been completely well in herself the whole time.

William Budd Health Centre,
Leinster Avenue,
Bristol, 4. H. I. HOWARD.

A NORWICH SURGEON'S DIARY

SIR,—As a great-grand-daughter of John Green Crosse I was extremely interested in your article last week about his diaries.

I have in my possession a letter from John Green Crosse to one of his sons (my grandfather), a number of bound volumes of his hospital cases, a bound printed copy of the report of the "Fourteenth Anniversary Meeting of the Provincial Medical and Surgical Association" which was held in Norwich in 1846 under his presidency, newspaper cuttings with reference to his death and funeral, and various portraits. I also have a letter written by one of his grandsons (my father's cousin) to my father, which gives some interesting sidelights on his life and character.

It is not generally known that John Green Crosse founded the Eastern branch of the Provincial Medical and Surgical Association, which was afterwards combined with that previously founded at Worcester by Sir Charles Hastings—the amalgamated societies ultimately becoming the British Medical Association.

John Green Crosse was honoured by being buried in the Cloisters of Norwich Cathedral.

Sorrento Maternity Hospital,
Birmingham. V. MARY CROSSE.

INTESTINAL OBSTRUCTION BY FOOD

SIR,—It is quite possible that intestinal obstruction by undigested food is much commoner after partial gastrectomy than the few published reports would suggest.

Some two months ago I encountered a case precisely similar to that described by Mr. Thompson Rowling (Aug. 11). In this instance an edentulous woman had swallowed whole several segments of orange which became impacted about half-way down the small bowel. As the obstruction was complete, the bowel had to be opened and the food removed.

Curiously enough, the patient had little recollection of eating the offending citrus.

Department of Surgery,
University of Liverpool. IAN W. MACPHEE.

SIR,—I was interested in Mr. Rowling's discussion of his two patients with obstruction due to oranges after partial gastrectomy. He refers to one of the cases which I reported previously with such an obstruction high in the jejunum. I have recently had a further example in an elderly edentulous man after a Polya partial gastrectomy with a wide stoma: here the bolus was impacted in the lower ileum and required enterotomy. It would be interesting to know of any patients with food obstructions after Billroth-I anastomoses.

I have also operated lately on a patient with a complete obstruction due to apples in the lower ileum, but he had not had a partial gastrectomy. It was possible to break up the tightly impacted bolus and "milk" it into the cæcum without ill effects.

Mansfield, Notts. NEIL WARD-MCQUAID.

BENZOCAINE IN LOZENGES

SIR,—Acute tonsillitis is a limited illness which usually responds rapidly to therapy. I have seen a number of cases, however, which showed unusual soreness, toxicity, and constitutional disturbance, with temperatures from 104 to 105°F, and slow response to treatment. In each of these cases an attempt had been made to abort the attack by the use of lozenges containing benzocaine. (As a victim of attacks of tonsillitis, I myself experienced my worst and most distressing episode after using similar lozenges.) I have also seen patients with chronic sore throat who said that the soreness had disappeared while taking such lozenges, but had then returned eventually, obliging them to seek medical advice.

These observations suggest that:

1. The tonsillitis was aggravated by the action of benzocaine on infected and inflamed tissue. This action may be comparable with that of guttæ cocainæ, which, if applied to the cornea continuously for the relief of pain, cause ulceration. *p*-Aminobenzoic acid, which is allied to benzocaine, is known to irritate the gastric mucosa.

2. Trauma of the inflamed tissue may also be caused by the full range of use encouraged by the transient benzocaine anæsthesia and disappearance of pain.

3. The action of the antibiotic or antiseptic moiety of the lozenge is less likely to be effective if the benzocaine is simultaneously causing trauma.

The use of surface anæsthesia to alleviate pain from infected and inflamed tissue does not appear to be scientifically sound in principle. No doubt benzocaine has its uses as a local anæsthetic in surgical and diagnostic procedures, but there seems to be good ground for questioning the wisdom of its use in vulnerable infected and inflamed tissues.

Salford, 7. S. M. FREEDMAN.

PROLONGED CHEMOTHERAPY IN CHRONIC PULMONARY TUBERCULOSIS

SIR,—Dr. Sickenga has raised some important points in his letter last week about our article of July 28.

The number of our patients was of course small, but the two groups R and IP were selected at random as described in our earlier paper.[1] The number of patients in group IP who showed streptomycin resistance at the end of treatment (see table VII) is certainly worthy of comment. In fact the organisms of these patients were tested for streptomycin sensitivity before treatment and only 2 out of 15 were found to be resistant. As Dr. Sickenga points out, this number had increased to 6 after the course of isoniazid and *p*-aminosalicylic acid (P.A.S.) although no streptomycin had been given. This difference is most apparent in the slope results. Tube results showed that only the 2 patients who were originally resistant to streptomycin remained highly resistant to this drug. Work in the department of bacteriology at Guy's [2] has shown the difficulties in interpreting drug-sensitivity tests and has emphasised that streptomycin slope tests are especially troublesome. The discrepancy may be due to the fact that the inoculum was smaller towards the end of therapy, as shown in table I in our paper. This means that the cultures grow more slowly and therefore the problem of drug inactivation assumes increasing importance.

We agree that table V, as cited by Dr Sickenga, in another of our previous papers [3] may be misleading. In fact 12 (not 3) of the 15 patients showed sensitivity to all three drugs after twenty-four weeks' therapy. 3 were resistant to streptomycin, and 2 of these were resistant to P.A.S. and isoniazid as well.

From our experience in the treatment of at least a hundred patients with chronic tuberculosis, we do not agree that P.A.S. resistance is likely to be any less permanent than that due to streptomycin, and we feel that the most effective chemotherapeutic regimen must include both isoniazid and streptomycin.

K. S. MACLEAN
K. MARSH
R. KNOX
J. D. CARROLL.
Guy's Hospital,
London, S.E.1.

1. Joiner, C. L., Maclean, K. S., Pritchard, E. K., Anderson, K., Collard, P., King, M. B., Knox, R. *Lancet*, 1952, ii, 843.
2. Worssam, A. R. H., Collard, P., Carroll, J. D., Knox, R. *Tubercle, Lond.* 1956, **37**, 73.
3. Joiner, C. L., Maclean, K. S., Carroll, J. D., Marsh, K., Collard, P., Knox, R. *Lancet*, 1954, ii, 663.

THE LETTERS OF PURKINJE

SIR,—Having recently completed an edition of the complete works of J. Purkyně, I am preparing to publish his letters. In this connection I am seeking especially letters which he wrote to the British physiologist, Martin Barry (1802–1855), and also any letters which show Purkyně's relations with the Royal Society. I should be grateful if anybody possessing letters by or concerning Purkyně, or anybody knowing of their whereabouts, would write to me.

Komenského nám 2,
Brno, Czechoslovakia. VLADISLAV KRUTA.

Obituary

HENRY HAROLD SCOTT

K.C.M.G., M.D. Lond., F.R.C.P. D.T.M. & H., D.P.H.

Sir Harold Scott, director of the Bureau of Hygiene and Tropical Diseases from 1935 to 1942, died at his home at Braintree on Aug. 6, three days after his eighty-second birthday.

He was born in 1874, the son of the Rev. D. L. Scott, LL.D. From Mercer's School and the City of London School he went to University College, London. He continued his medical studies at St. Thomas's Hospital and St. Bartholomew's Hospital, qualifying in 1897. During the South African war he served in the R.A.M.C., and in 1901 he demonstrated the Klebs-Löffler bacillus in the skin in veldt sores. After he returned to this country he spent some years in practice at Ludlow, but in 1910 he went abroad again on his appointment as government pathologist in Jamaica, where he carried out neurological research, demanding exacting technique, on vomiting sickness and on central neuritis (now known as the Strachan-Scott syndrome).

[Russell

During the 1914–18 war he served with the R.A.M.C. as pathologist to the Cambridge Hospital, Aldershot. After he was demobilised he held a Milner fellowship in comparative pathology at the London School of Hygiene and Tropical Medicine. In 1922 he took the D.T.M. & H. and went as government pathologist and bacteriologist to Hong-Kong, where he made a special study of pulmonary tuberculosis. He continued this work on his return to this country when he became pathologist to the Zoological Society and investigated the comparative pathology of tuberculosis in man and animals. While at the Zoo he also investigated the ætiology and pathology of fungus infection in birds and reptiles. He was elected F.R.C.P. in 1925.

In 1928 he became medical secretary to the Colonial Medical Research Committee. For this committee he published two long surveys of medical research in the Colonies. He had previously collaborated with Andrew Balfour in writing *Health Problems of the Empire* (1924), and through his own experience in South Africa, Jamaica, and Hong-Kong, and through his studies of the reports and papers from the different Colonies, he acquired wide knowledge of health problems which was valuable to him when he served on the Colonial Advisory Medical Committee.

Scott early joined the distinguished panel of scientists who contributed abstracts and reviews to the *Tropical Diseases Bulletin*, and in 1930 he was appointed assistant director of the Bureau of Hygiene and Tropical Diseases which, under the directorship of Dr. (later Sir) Arthur Bagshawe, produced both the *Tropical Diseases Bulletin* and the *Bulletin of Hygiene*. When Bagshawe retired in 1935 Scott was appointed director. His first duty as assistant director was to take over the *Bulletin of Hygiene;* his second was to write, each year until 1935, the *Supplement* to the *Tropical Diseases Bulletin* in which were summarised the annual medical reports of the Colonies. In 1939, when war seemed imminent, an agreement was made with the Medical Research Council and the Services that the Bureau should prepare to produce the *Bulletin of War Medicine*. In 1940 the first issue appeared, and, until he retired in 1942, Scott edited this publication, which was valued highly among the Allied Forces. He was appointed K.C.M.G. in 1941.

The war and the bombing of London, through which he lived in Bloomsbury, proved a trial to Scott, and in 1942 he retired to Essex. But he continued to work for the bureau—proof-reading and reviewing—until his death. In retirement he edited the *British Red Cross Manual of Tropical Hygiene* and the proceedings of the ninth International Congress on Industrial Medicine.

He was for many years closely associated with the Royal Society of Tropical Medicine and Hygiene, serving on the council, and finally being elected president in 1943. For many years he examined for the University of Liverpool and for the Conjoint Board, and one of his colleagues, P. H. M-B., writes:

In conversation Harold Scott had a fund of knowledge of a most serviceable kind and then it was borne upon one how wide and accurate his store of information really was. To examine with him was a joy. For orals he would produce a bundle of typewritten and searching questions, and I used to keep a notebook to jot down the pearls which fell from his lips, which ranged throughout the whole of bacteriology, pathology, and tropical medicine. I have never met a more patient or fairer examiner, and for the candidates it was obviously a pleasure to be examined by him.

C. W., whose association with Scott goes back to 1930, remembers him in his prime as a slight, well-dressed man, with good features and a twinkle in his quizzical eye.

He was never pompous, and he was never harassed. As a friend he was more than generous, and he had many friends. They will not need to be reminded that he bore his last illness with courage, and with a certain exasperation because it interfered with his intellectual activities and his capacity for work; it did not diminish his sense of fun or his capacity for mimicry. I received a letter from him, taken down at dictation by his wife on his last birthday, which contained a postscript in his own handwriting. "I see that I have the honour of mention in the *Daily Telegraph* Birthdays today. Fame at last! Shop-lifters also receive mention."

This sense of fun was always one of his most endearing traits, and made working with him easy and exciting; he was never dull. As an editor he had the faculty of seeing the unintended, and often ludicrous, meaning that could be read into a poorly written sentence, and would comment marginally on a galley in pungent terms.

He himself wrote a lot. He was a stylist whose language was based on a love of Latin and Greek (and half a dozen modern languages), and on a phenomenal capacity for reading. He read everything—history, biography, travel books, and novels—and he enjoyed himself most of all, perhaps, when he was able to spend an afternoon picking out bargains in the Charing Cross Road bookshops or the bookstalls in the market at Cambridge. Famous trials fascinated him; and only last year he bought the set of *State Trials*. This attraction to the technique of seeking the truth by examining evidence might have explained his choice of pathology as his chief medical interest. It certainly influenced him in the writing of his book *Some Notable Epidemics* (1934) which had the gripping qualities of a superb detective story.

Scott's greatest literary work was undoubtedly his *History of Tropical Medicine* (1939), the best and most comprehensive book ever written on this fascinating subject. It was based on the FitzPatrick lectures he gave at the Royal College of Physicians, and it shows a comprehensive sweep of narrative which includes, but is not swamped by, the mass of detail selected from his wide reading. Hard, intense, and close work of this kind did not fatigue him; he had toughness of mind and body. His trend of mind was optimistic and inquiring rather than theoretically speculative; he had his share of

scientific scepticism, but he gave the impression that he believed that most problems could be solved if examined with imagination and care.

Sir Harold was twice married. His first wife, Harriette Preston, died in 1933. His second wife, Eileen Anne, daughter of the Rev. R. P. Prichard, survives him.

ROBERT SCOT-SKIRVING

M.B. Edin., F.R.C.S., F.R.A.C.S., F.R.A.C.P.

Dr. Scot-Skirving, who died on July 15 at the age of 96, spent almost all his long and distinguished professional life in Sydney, but he was born in Haddington and educated in Edinburgh and he remained a Scot in all save the accident of locality. As the oldest graduate of the University of Edinburgh and the senior doctor of Australia he received many courtesy calls. Those who came to pay their respects usually found that they were also giving their friendship, and over the years Dr. Scot-Skirving strengthened and maintained these ties with his university, his country, and his profession by long and lively letters. He had read widely, and everything he wrote was enriched by apt quotations from the Bible which had been his earliest textbook and remained his most constant work of reference.

He was a student at Edinburgh in the '70s, and he recalled that the first operation he ever saw was performed by Lister. He was also a contemporary of Conan Doyle, and like him was a student of Joseph Bell who was said to have served as a model for Sherlock Holmes. Scot-Skirving later wrote of one of Bell's clinics :

A woman with a small child was shown in. Joe Bell said good morning to her and she said good morning in reply. "What sort of a crossing di' ye have fra' Burntisland ?" "It was guid." "And had ye a guid walk up Inverleith Row ?" "Yes." "And what did ye do with th' other wain ?" "I left him with my sister in Leith." "And would ye still be working at the linoleum factory ?" "Yes, I am." "You see gentlemen, when she said good morning to me I noted her Fife accent, and, as you know, the nearest town in Fife is Burntisland. You noticed the red clay on the edges of the soles of her shoes, and the only such clay within 20 miles of Edinburgh is in the Botanical Gardens. Inverleith Row borders the gardens and is her nearest way here from Leith. You observed that the coat she carried over her arm is too big for the child who is with her, and therefore she set out from home with two children. Finally she has a dermatitis on the fingers of the right hand which is peculiar to workers in the linoleum factory at Burntisland."

Scot-Skirving had a persistent urge to travel. Before he began to study medicine he went to sea in sailing-ships, and soon after he graduated with honours in 1881 he sailed for Australia. In 1883 he became medical superintendent of the Royal Prince Alfred Hospital in Sydney. During the South African war he served as a consulting surgeon and during the 1914–18 war he was surgeon in charge of the census division at Queen Alexandra Hospital, Millbank. Apart from these interludes he remained at Sydney, where he was honorary physician to the Royal Prince Alfred Hospital and honorary surgeon to the St. Vincent's Hospital. He was a foundation fellow of the Royal Australasian College of Surgeons, a fellow of the Royal Australasian College of Physicians, and a fellow by election of the Royal College of Surgeons of England. He had a large and varied practice from which he never really retired, and in his nineties he was still seeing patients and lecturing. He had always been a stimulating, if not consistent, teacher, and one of his students recalls how he would impress on a class about to enter the wards that the only important person was the patient.

"He is a sick man uprooted from his home and all his friends. He must be treated with the greatest gentleness, sympathy, tact, and understanding." Then a student came forward and asked the man his name, address, and age. When he came to ask him his occupation, the answer was "billiard marker." Scot-Skirving dashed forward and addressed the man. "Do you mean to say you've spent all your years marking billiard cues ? God made you a man and created you in his image. How dare you say that's all you did with your life ? Why, I'd rather I were a cabbage and eaten by a worm !"

Scot-Skirving's own life was continuous proof of his abhorrence of a vegetable existence; and his young friends—and for the last decade to him all his friends were young—will long remember him as a "magnificent example of the good Scots who were fed on the Bible."

HENRY HERD

M.A., M.B. Edin., M.Sc. Manc.

When Dr. Herd retired from the post of school medical officer for Manchester seventeen years ago the education committee passed a special resolution expressing appreciation of the work he had done for crippled children, and for the problem child, and of the distinction which he had conferred on the city by "his remarkable work on mental deficiency." Outside Manchester he will probably be best remembered for his research and writings on the problems of educational backwardness and mental deficiency.

Originally he intended to work as a teacher, but after taking his M.A. in Edinburgh in 1894 he turned to medicine, graduating M.B. in 1902. He was one of the original four assistant school medical officers appointed in Manchester in 1909 to carry out the requirements of the Administrative Provisions (Education) Act of 1907. His early duties were those of school inspections and treatment of school-children at the central and district clinics. In 1921, when additional medical officers were appointed, he was made the senior assistant and undertook the examination of children under the Mental Deficiency Acts. He was also responsible for the supervision of the special schools for mentally subnormal children. The knowledge which he gained during the years which followed provided the material for his book on the *Diagnosis of Mental Deficiency* which was published in 1930. He was also a member of the British Medical Association's committee on mental deficiency and physical education, and of the executive committee of the Child Guidance Council, and he was medical secretary of the Central Association for Mental Welfare.

In 1930 Dr. Herd was appointed to the post of school medical officer of the city. A year or two later he expressed the opinion that the service seemed to have reached a state of stalemate and required development. He accordingly recommended the appointment of a consultant aurist, not only to deal with the tonsil-and-adenoid cases, but to study deafness in school-children. One of the results of this appointment was the introduction of gramophone and pure-tone audiometers. Then followed, again on Dr. Herd's recommendation, the appointment of a speech therapist, and shortly afterwards the inclusion in the school medical service of a child-guidance clinic, with a part-time psychiatrist.

E. M. J. writes :

After his retirement Dr. Herd continued to take an active interest in school medical work and from time to time contributed articles to medical journals. His views on the "soul-destroying" character of routine medical inspections and his suggested alternatives are still the subject of discussion by his younger colleagues. His hobbies were literature and music ; in fact he was an accomplished pianist. His natural modesty and somewhat retiring nature were unaffected by his undoubted success. As a guide or as a chief he was much beloved and respected by those who worked with him.

In recognition of his service to the children of Manchester, the university conferred on him the honorary degree of M.SC. in 1942. He died on July 9 at the age of 82.

EFFIE LILIAN HUTTON

M.B. Lond., D.P.M.

Dr. Lilian Hutton, clinical director of the Burden Neurological Institute, near Bristol, died on Aug. 8 at the age of 52.

She graduated M.B. from the London School of Medicine for Women in 1928, and after serving as a medical officer at Rainhill Mental Hospital she joined the London County Council mental-hospital service. Dr. W. D. Nicol was at that time setting up the malaria therapy

clinic at Horton, and she joined him as resident medical officer. The clinic became the centre throughout the Empire for important work on malarial infection, as well as for the treatment of neurosyphilis. In 1939 Dr. Hutton joined the staff of the Burden Institute, where she began her studies of the psychological effects of electroconvulsive therapy and prefrontal leucotomy. Her series of papers on these techniques and their after-effects proved to be of almost prophetic value in the understanding of many of the implications of these treatments. Later, her interest was almost entirely given to the treatment of neuroses.

F. L. G. writes:

Dr. Hutton had a rare type of mind. She was able to counter the often disastrous effects of the purely mechanistic approach to problems of personality incident to much medical education, with a sympathetic understanding of the approach to the difficulties of spiritual life. A holistic approach to the problems of psychotherapy made it possible for her to express them in either such physiological or psychological terms as she found most adequate for any particular occasion. Such a mental attitude is too often misunderstood by those who fail to appreciate the essential dialectic of all thought directed to the elucidation of neuropsychological problems. It was, however, by her sympathetic approach to the spiritual aspect of the problems of neurosis that she achieved her greatest success in psychotherapy. Jung has told us that every case of neurosis is that of a human being in search of his soul. Dr. Hutton reinterpreted this as a search for love. For her, psychotherapy was the attempt to inculcate love, not only intrapersonal but for the universe in all its aspects. To attempt this with any degree of success is for most of us an almost hopeless task if we are without the supreme gift of charity. It is not easy to understand how such a power to help the neurotic can be imparted to others engaged in psychotherapy. She was probably right when she maintained that without belief in the permanence of transcendent values, that is without religion, psychotherapy can rarely succeed. Dr. Hutton was a tireless worker, and she has left a mass of unpublished clinical material. It is a saddening thought that with so much to give she left us in the fullness of her powers. She was adored by her patients and all her colleagues. No matter what the orientation of their clinical work they found her a kindly, wise, and lovable collaborator.

JAMES CAMPBELL BAIRD
M.B. Glasg.

Dr. J. C. Baird, born in Ayrshire 59 years ago, practised at Blackpool for the greater part of his professional life. He took up medicine after serving in the 1914–18 war, qualifying M.B. at Glasgow in 1926. Thereafter general practice absorbed his painstaking and keenly enthusiastic clinical abilities. He developed a widespread connection in the Fylde. Later, his contribution came from work as an E.M.O. to various Ministries. His good sense, charm, and quiet friendly sympathy endeared him to all. Integrity and deep loyalty to everything in his personal world placed him high in our esteem and kindled a warm response in our hearts. Distinctive by his native simplicity and naturalness, these traits prevented him from ever seeing evil in a fellow-creature; and he held to a faith unrelenting in all his friends and patients. He died on Aug. 7.

E. G. E.

Births, Marriages, and Deaths

BIRTHS

NAGLEY.—On Aug. 1, at Farnborough Hospital, Kent, to Sylvia, wife of Dr. Martin M. Nagley—a son (Timothy Nigel).

Appointments

EVANS, D. M., M.D. Lond., M.R.C.P.: consultant pathologist, Cardiff H.M.C.

GLYNN, ADA, PH.D Lond., M.R.C.S., D.P.M.: consultant psychiatrist, Winterton Hospital, Sedgefield.

MILLS, R. H. B., M.B. Camb., F.R.C.S.: whole-time asst. traumatic surgeon, East Glamorgan Hospital.

WALSH, A., M.B. N.U.I.: whole-time asst. ophthalmologist, Newport and East Monmouthshire H.M.C.

Notes and News

COMPOSITION OF FLOUR AND BREAD

THE Food Standards Committee is to consider whether, in addition to the requirements as to the content in flour of vitamin B_1, nicotinic acid, and iron, more extensive regulations governing the composition of flour and bread are needed to protect the consumer. They will not, however, be concerned with those questions of policy on which the Government have already reached decisions [1] and issued regulations and orders.[2]

In the first instance the committee will consider the need for regulations governing the composition of flour, the appropriate amounts of the three nutrients that are already required to be present in flour and bread, the present compulsory addition of calcium, the possible compulsory addition of riboflavine, and the composition and labelling of special types of bread and flour. Evidence on these questions, from organisations, is invited by the committee, whose secretary may be addressed at the Ministry of Agriculture, Fisheries, and Food, Great Westminster House, Horseferry Road, London, S.W.1.

MEDICAL RESEARCH COUNCIL OF IRELAND

LAST October Prof. J. F. Cunningham, F.R.C.O.G., became chairman of the council in succession to Prof. R. P. Farnan, M.D., who had presided from its inception. The multigraphed report for 1955 [3] records much varied work done on slender resources. Grants from Messrs. Guinness and Messrs. Geigy helped with research on the chemotherapy of tuberculosis; but for general purposes the council had to rely on £21,000 from the ministry of health. Some time ago it expressed a hope that the ministry would be able to give a substantially larger grant and guarantee its maintenance for a period sufficient to permit long-term planning; but the increase has been only to £23,000, guaranteed for three years. While appreciating the minister's difficulties, the council point out that the increase is hardly enough to adjust the payment of its workers in accordance with rises in the cost of living; and no security of tenure can be offered them.

A special grant was made by the ministry for a survey of poliomyelitis-virus antibodies in the sera of certain groups of the population—in which Dr. P. N. Meenan is undertaking the laboratory investigations. The clinical trial of 'Hinconstarch' has been extended to more than 60 patients with pulmonary or renal tuberculosis, and an encouraging report of the results of three months' treatment of the first 12 pulmonary cases is appearing in the *American Review of Tuberculosis*. In an account of 100 cases of anencephaly in Dublin, Dr. Victoria Coffey says that the incidence of the condition corresponds with the highest reported figures of other countries. The finding which seems to her most important is an association of anencephaly with malnutrition in the mother, which has previously been recorded in animal experiments but not in human beings. She feels that the deterioration of maternal nutrition in Dublin in the past few years calls for further examination. Mr. W. F. Hemmens describes tests on the diet of children with cœliac disease which "in the main" confirmed Dutch work on the relation between fat excretion and the intake of wheat-protein. A diet in which oats were substituted for wheat had no ill effects during a seventeen-week trial, though the growth of the children was probably less than it would have been on a diet not containing any gliadine at all.

THE CIBA FOUNDATION

QUIETLY, efficiently, and generously, the Ciba Foundation at 41, Portland Place, London, W.1, continues and extends its work "for the promotion of international coöperation in medical and chemical research." One of the ways in which it helps is to provide accommodation (bed and breakfast) for scientific workers—mainly those in medical or biological science—who are in London for short periods, especially those whose visits might otherwise be doubtful or impossible; and in 1955 nearly 800 were thus received. Some were members of the foundation's international conferences, of which seven were held during the year, the proceedings of four being now available in book form. In addition there were five discussion meetings, four sessions of the quarterly clinical forum,

1. *Lancet*, 1956, i, 800, 810, 895.
2. *Ibid*, Aug. 11, 1956, p. 301.
3. From the council's offices at 50, Merrion Square, Dublin.

and five of the new film sessions. Six doctors were granted bursaries for work in France, and the first seven international awards were made for papers describing research relevant to ageing—a subject on which the foundation wants to encourage investigation by the younger workers. The small special library forms a very useful complement to the larger medical and scientific libraries of London.

The director, Dr. G. E. W. Wolstenholme, now has a medical assistant in Dr. H. N. H. Genese.

TRUTH AND ERROR IN ENDOCRINOLOGY

"EVEN if the birth year of our subject is more ancient and obscure," said Dr. Allan T. Kenyon, of Chicago, in a presidential address to the Endocrine Society,[1] "we can at least celebrate the centenary of our name year." For in 1855 Claude Bernard used the phrase "internal secretion" for the first time.

Whereas countless orations deal with what should be done or with what should not be done, Dr. Kenyon, calling himself "unreliable on such matters," chose to speak on a particular man's place in the life of his subject. The neurological research first expressed in a medical thesis of 1846 is still recalled by the eponymic "Brown-Séquard syndrome"; but it was ten years later that Brown-Séquard entered the story of endocrinology by producing in animals a counterpart of the disease that Addison in his monograph of 1855 had correctly attributed to destruction of the adrenal glands. In an eventful life making big demands on his strength, he came to dwell more and more on "nervous force," the source of the energies of men; and at the age of 72 his fatigue was such that he decided to tackle it directly. Forty-three years after his experimental adrenalectomies, he injected into himself watery extracts of the testes of dogs and guineapigs, made by his assistant D'Arsonval; and his report of 1889 showed such firm conviction of benefit that before the end of the year more than 12,000 doctors were administering the extract to their patients.

Despite criticism and derision, his conviction was never shaken, and from it came "a new statement of the doctrine of internal secretions, or a restatement, if you will, of Bordeau's older theories of a hundred years before." Brown-Séquard declared that all glands with an external secretion have at the same time an internal secretion, and he went on to foretell "a new system of therapeutics, the medicaments of which will be products made from the different tissues of the organism." D'Arsonval at his instance was attempting to extract the pancreas for the cure of diabetes and had before him recommendations to extract suprarenal and thyroid glands.

"The adventure of Brown-Séquard in ill-placed glandular treatment is held to have provoked a mad use of many kinds of useless agents and to have given Endocrinology a very bad name," said Dr. Kenyon. "But there were others with him who cared, perhaps not more for the truth as an end, but more for truer ways towards the truth. . . . As we to Brown-Séquard so to us in turn. For each small truth that is in anyone of us will be found by others, be conserved and be enlarged and each mad error will be curtailed and if nothing good can be made of it pruned away. So works the Good Society and ours is a fragment of it."

MENTAL HOSPITALS IN SCOTLAND

No mental hospital has been built in Scotland since 1909, and 8 of the 29 National Health Service mental hospitals are over a hundred years old. The work which the General Board of Control for Scotland describes[2] is thus carried on under difficulties. Adaptation, redecoration, and refurnishing have improved many outmoded buildings, but much more could be done, the board believe, if money was available. The board also ask hospital authorities to give high priority to the appointment of more medical staff. "More staff in the clinics and for consultative purposes with the family doctor might well result in the not too distant future in a reduction in the number of patients who would require to seek hospital treatment."

In 1955 the number of patients admitted to mental hospitals in Scotland was 9168, an increase of 657 compared with 1954. Admissions of voluntary patients again increased, and were about 72% of the total admissions, but the number of voluntary patients was still only 21% of the total number in hospital. The number of discharges both of certified and voluntary patients rose, and, with deaths, more than offset the number of admissions. Thus there were 20,773 patients in hospital at the end of 1955, or 57 less than in 1954. The board believe that this small decrease was probably fortuitous and "should not be taken as indicative of any downward tendency as yet in the number of the mentally ill who require long periods of treatment in hospital."

The number of certified mental defectives was 8065, or 207 more than at the end of 1954. 5513 were patients in institutions, and 2552 were under guardianship. The use of this traditionally Scottish method of care has tended of late to decrease for the mentally ill but to increase for mental defectives.

FOR CHILDREN GOING INTO HOSPITAL

A GOOD many hospitals have produced leaflets or booklets of information for adults whose names are on waiting-lists for admission. Less has been done for children in this way, but now the Central Council for Health Education has produced a leaflet called "Coming into Hospital" which may be had from the Council's office at Tavistock House North, Tavistock Square, London, W.C.1, for 2½*d.* post free. The letterpress is naturally addressed to the parents, and it deals briefly and sensibly with the preparations for admission, visiting in hospital, and the return home. The greater part of the leaflet is taken up by drawings of a children's ward, of personal belongings which are taken to hospital, and of arriving home again, which are designed to be used by the parents for explanatory purposes before admission: the leaflet says, "You can use the picture for telling stories," and we hope that most mothers will take the meaning directly instead of reading it as the common euphemism.

This leaflet should and will be widely used; but many hospitals will wish to have something more personal. (That one can without thinking write of an institution as having wishes and a personality shows that this is so.) The only strong objection would be the expense of an individual production. A most attractive booklet entitled "Going to the Hospital" has been produced for the children's department of the Whittington Hospital, Dartmouth Park Hill, London, N.19. It is slightly more elaborate than the leaflet; but its chief advantages are that visiting hours for each ward are given, the names of the sister, house-physician, registrar, specialist, and almoner can be included; and times for interviewing the registrar are stated, difficulties caused by the wards not having outside telephones are mentioned, and so on. This prettily illustrated 8-page booklet will help thousands of parents of children who go to the Whittington Hospital and will thus also reduce the puzzlement of many of the patients.

In general hospitals the patients are not the only people who are puzzled when they arrive in the children's wards, for new nurses in training often turn up for short periods of work clearly without any idea of child care or knowledge of infants' behaviour. The ward sister has to explain a great deal to each new nurse, who may not take it all in at first; so a booklet such as "On the Children's Ward" (also produced for the Whittington Hospital), which she can read later in the day, will make her mental adjustment easier. This little publication is written specifically for nurses in one hospital but may be taken by others as a model for their own productions.

OLD AND NEW

AFTER an anthropological survey of a Peruvian valley, Edward Wellin has given an account[1] of the practices and beliefs associated with childbirth, and the way in which they are being slowly modified by contact with modern hospitals and trained personnel. The resistances to such change are well described, and show a strong resemblance to those in other parts of the world. Where the modern methods fail, they fail because of lack of sympathy and understanding. Many patients seem to think that the staff ignore their ideas and their needs, and are generally ungracious.

The editorial preface to this report asks whether it is wise "to attempt to build health services on changes in such an intimate and fundamental aspect of life as the practices associated with childbirth." The answer perhaps lies in the report itself. The hospital, we are told, is "outside the community." The staff are comparatively sophisticated people with an urban background. Their training has been institutional: it has taught them how to treat diseases but not how to treat patients. This is a good example of the need for radical alteration in methods of organisation and

1. *Endocrinology*, 1956, **58**, 284
2. Annual report of the General Board of Control for Scotland for 1955. H.M. Stationery Office. Pp. 20. 1*s.* 6*d.*

1. Summarised in the *Health Information Digest for Hot Countries*, 1956, **3**, no. 1. Edited by Dr. Anne Burgess and produced by the Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1. 1*s.*

training. Without it, "developing" and backward people will take a long time before they accept improved forms of medicine. Time, money, and effort will be wasted on setting up modern medical units which, working as they do now, can only confer moderate benefits.

AN INDEPENDENT MENTAL HOSPITAL

OPENED at York in 1796, The Retreat was the first mental hospital in England where mental disorders were regarded as illness requiring sympathy and scientific treatment. It remains outside the National Health Service and its control is vested in forty governors who must all be members of the Society of Friends.

In his fifth and last report as physician-superintendent,[1] Dr. Alfred Torrie says that last year 464 patients were admitted (92% as voluntary patients) and 454 discharged, of whom 380 were either recovered or relieved. But he expresses concern at the continuing increase in readmissions, not only at The Retreat but throughout the country. Linking this with the greater turnover of cases, he remarks that though "the treatment a hundred years ago in this hospital had not the advantage of the modern methods of speedy recovery, one feels that their psychological methods, although slow, were more lasting." Drawing a parallel with modern methods of treating infections, he quotes an editorial in the *Practitioner*:

"Have we forgotten that Nature can deal with many of these infections, and deal with them much more effectively, though possibly less expeditiously, than we can with antibiotics? The antibiotics may, and often do, knock out the infecting organism very rapidly, but in so doing they deprive the patient of that immunity from subsequent infection which he would have acquired if the infection had been allowed to run its course."

Dr. Torrie speaks also of the need for participation and coöperation in institutional life.

"The world is in a state of transition and is struggling to free itself from oligarchic or autocratic forms of government. The transition will take a long time because the infantile part of ourselves prefers that kind of leadership, although consciously we praise the other kind. The Quaker way of life involves the belief of that of God in every man and with this belief comes the responsibility to act in unison with our fellows as equal children of God. Perhaps it may be that only in a monastery could this ideal be carried out."

Dr. Cecil Beresford, now physician-superintendent, speaks of the innovations—some far-reaching—for which Dr. Torrie has been responsible; and "during his stay we have been a happy and united medical team." As the former clinical director, Dr. Beresford says that the number of admissions—higher than ever before—called for efforts from the staff which cannot be sustained indefinitely. Like Dr. Torrie, he feels that treatment can be too quick and result in a higher relapse-rate. Where the length of stay "depends on the patience of the person under treatment, we do our best to encourage that person to remain longer." The rise in the number of psychoneurotics admitted he regards as a heartening sign, since prejudiced fear of mental hospitals has often prevented their getting appropriate treatment. "We have steadily increased the number of open wards so that now of eleven departments four are completely open and two others for most of the day. The scheme of reconstruction necessary before we can conveniently open others has already begun and we hope to have the whole scheme completed within two years."

MEDICAL FILM

A NEW film on domiciliary midwifery, *The Home Confinement* (16 mm., sound, black and white, 20 minutes, Great Britain, 1956), opens with the first visit of a midwife to the home of her patient.

The selected room is shown, and the ideal rearrangement of the furniture is indicated on a chart. Next the articles which the expectant mother should provide for herself and for her baby are shown. In the second half of the film the midwife arrives in answer to the husband's call and prepares for the delivery. After the delivery—which is not shown—the midwife leaves, indicating that she will be returning for the postnatal care.

Though not the first film on the subject, this has the advantage that, by omitting the delivery, it can be shown to lay audiences. The efficiency and confidence of the midwife would reassure the antenatal patient; but the sequence listing the articles which the mother should provide is tedious and irrelevant, especially as a printed list is usually issued. The film might also interest pupil midwives completing part I, and possibly senior schoolgirls.

Copies may be had free of charge from the Gaumont British Film Library (Industrial Department), Aintree Road, Perivale, Middlesex.

1. 159th Annual Report of the Physician Superintendent of The Retreat, Heslington Road, York.

University of Liverpool

Dr. H. F. Jarvie has been appointed to a senior lectureship in the department of studies in psychological medicine.

Biochemical Society

A meeting of this society will be held in Dublin on Sept. 14 and 15.

British Association

The annual meeting of this association will be held at Sheffield from Aug. 29 to Sept. 5 under the presidency of Sir Raymond Priestley, D.SC.

Biology of Ageing

The Institute of Biology is holding a symposium on this subject at University College, Gower Street, London, W.C.1, on Sept. 27 and 28. Further particulars may be had from the secretary of the institute, 41, Queen's Gate, S.W.7.

European Association against Poliomyelitis

This association is holding a symposium in Bologna from Sept. 20 to 22. The speakers will include Dr. W. H. Bradley and Mr. H. J. Seddon. Further particulars may be had from Dr. Pierre Recht, 67, Boulevard A. Reyers, Brussels, Belgium.

London County Medical Society

At a meeting of this society to be held at County Hall, Westminster Bridge, S.E.1, on Thursday, Oct. 4 at 5.30 P.M., Sir Clement Price Thomas will speak on carcinoma of the lung. Members of the Association of Industrial Medical Officers, the Middlesex County Medical Society, and all London divisions of the British Medical Association are invited.

Mental Health Research Fund

The Fund has announced the following awards: a grant (£200) has been made to Dr. James Hislop, of the department of human ecology and university health service, Cambridge; a Leverhulme grant (£1000 per year for two years) to the University of Leeds towards the cost of a senior research fellowship awarded to Dr. Max Hamilton, senior lecturer in the department of psychiatry; a travelling fellowship (£1150 for one year) has been awarded to Mr. R. P. Hullin, PH.D., lecturer in the department of biochemistry, University of Leeds.

Rockefeller Foundation

During the second quarter of 1956 the foundation has distributed in grants over $6¼ million, of which $2,140,000 went to medical education and public health, and $1,800,000 to biological and medical research.

The grants to medical education included $950,000 to three medical colleges in India—the Christian Medical College, Vellore, King George's Medical College, Lucknow, and The Seth Gordhandas Sunderdas Medical College, Bombay.

Among grants to medical research is one of £17,000 to the London School of Hygiene and Tropical Medicine to investigate the characteristics of tropical foods.

A new five-year grant of 55,000 Canadian dollars has been made to the work of Mr. J. H. Quastel, D.SC., F.R.S., director of Canada's Institute of Special Research in Cell Metabolism, Montreal. Dr. Quastel is to study the effects on the processes of cell metabolism of tranquillising and other drugs used in the treatment of mental illness.

St. George-in-the-East Hospital, London

As this hospital is to be closed on Sept. 30, arrangements have been made by the North East Metropolitan Board, in consultation with the Stepney Group Hospital Management Committee, who are the managers of the hospital, and the neighbouring hospital management committee, the Bow group, to ensure that hospital and specialist services are available in nearby hospitals for the people of Wapping and Shadwell. Hospitals most conveniently situated for patients from this area are:

Mile End Hospital, Bancroft Road, E.1.
London Jewish Hospital, Stepney Green, E.1.
St. Andrew's Hospital, Devons Road, Bow, E.3.
Poplar Hospital, East India Dock Road, E.14.
The London Hospital, Whitechapel, E.1.

All inquiries in connection with the closure should be addressed to the secretary, Stepney Group Hospital Management Committee, Raine Street, Wapping, E.1.

Sir John McNee has been installed as warden of the Barbers' Company.

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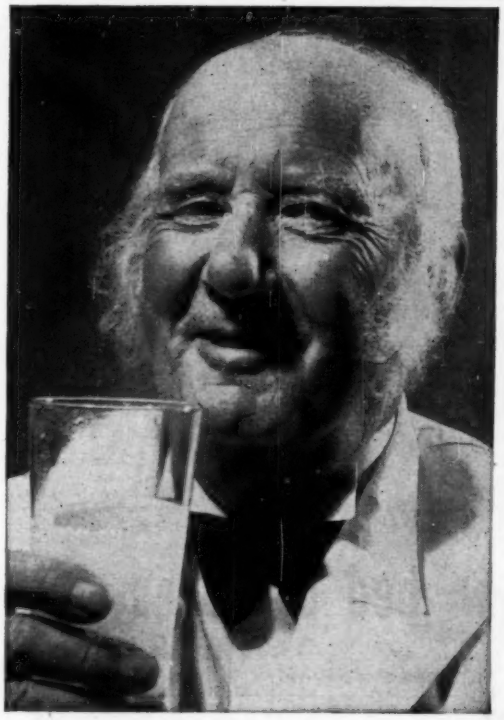

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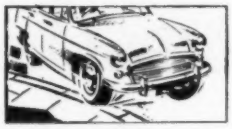

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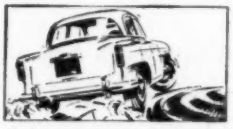

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Academic and Educational

THE UNIVERSITY and the ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW

POSTGRADUATE MEDICAL EDUCATION COMMITTEE

REFRESHER COURSE FOR GENERAL PRACTITIONERS

A Refresher Course at Stobhill General Hospital of 1 weeks duration designed for General Practitioners will be held from 24TH to 29TH SEPTEMBER, 1956. The Course will consist, whenever possible, of bedside discussions and clinical conferences. Sessions will be held dealing with General and Pædiatric Medicine, Surgery, Obstetrics, Gynæcology, Cardiology, Dermatology, Ophthalmology, Psychiatry, Diseases of the Ear, Nose and Throat, Biochemistry and Rehabilitation of the Aged. Lunch will be available at the Hospital.

The fee for practitioners not claiming expenses from Government sources is 5 guineas.

COURSE IN CHEMOTHERAPY FOR GENERAL PRACTITIONERS

A short intensive Course on the Principles and Application of Chemotherapy in Acute and Chronic Infectious Diseases will be held at Ruchill Hospital, Glasgow, from MONDAY, 1ST OCTOBER, to SATURDAY, 6TH OCTOBER, 1956.

The Course will comprise lectures and demonstrations in the following main divisions :—

(1) A Course of systematic lectures on the different infectious diseases, including pneumonia and tuberculoses. These lectures will be followed by appropriate clinical demonstrations.

(2) A Course of lectures and demonstrations which will describe all forms of chemotherapy, their scope and effective application.

(3) Practical demonstrations of the bacteriological, virological and pathological techniques used in diagnosis and control of infectious disease.

Lunch will be available at the Hospital.

The fee for practitioners not claiming expenses from Government sources is 5 guineas.

The usual arrangements are available to National Health Service practitioners attending either of the above Courses whereby the fee, cost of travelling and subsistence, and locum expenses may, subject to certain conditions, be recovered from Government sources. The Courses are being held in consecutive weeks and practitioners may attend either Course or both.

Since the numbers are limited, those wishing to attend should make early application to the Director of Post-Graduate Medical Education, The University, Glasgow, W.2, from whom further information may be obtained. Applicants should state clearly which of the Courses they desire to attend.

PRIMARY EXAMINATION FOR THE SURGICAL FELLOWSHIPS

A COURSE OF INSTRUCTION in Anatomy, Physiology, Biochemistry, Pathology and Bacteriology suitable for candidates preparing for the Primary Examination of the Fellowship *qua* Surgeon of the Royal Faculty of Physicians and Surgeons of Glasgow will be held from 8TH OCTOBER to 30TH NOVEMBER, 1956. (The Primary Examination conducted by the Glasgow Royal Faculty is accepted by the Royal Colleges of Surgeons of Edinburgh, of England, and in Ireland in lieu of the corresponding examinations of these Bodies.)

The Course will comprise a total of approximately 160 hours instruction given daily from MONDAYS to FRIDAYS, between the hours of NOON and 5.30 P.M.

The Course will be open to junior staff of hospitals in the Western Region of Scotland and also to other suitable applicants. Applicants not employed in the hospitals of the Western Region will, so far as can be arranged, be given an honorary clinical attachment to one of the surgical teaching units.

The fee for the Course is 25 guineas.

COURSE IN MENTAL DEFICIENCY

A short intensive postgraduate Course in Mental Deficiency will be held from 8TH OCTOBER to 26TH OCTOBER, 1956.

The Course will comprise :—

(*a*) Lectures and demonstrations in various aspects of mental handicap and mental deficiency ;

(*b*) Instruction in mental testing ;

(*c*) Visits to institutions.

The fee for the Course is 15 guineas.

The Course will be limited to 20 practitioners, places being allocated in order of return of application forms. Further information may be obtained from the Director of Post-Graduate Education, Medical Faculty Office, The University, Glasgow, W.2.

COURSES IN RADIOTHERAPY AND RADIODIAGNOSIS

Courses of instruction for the D.M.R.(T) and the D.M.R.(D) are available at the Glasgow Western and the Glasgow Royal Infirmaries. The Courses commence in OCTOBER, 1956, and occupy a period of 2 years. The fee is 50 guineas. A limited number of remunerated staff posts are available for trainees undertaking these Courses. Further information may be obtained from the Director of Post-Graduate Medical Education, The University, Glasgow, W.2.

UNIVERSITY OF BIRMINGHAM. Faculty of Medicine. Applications are invited for the post of LECTURER IN EXPERIMENTAL PATHOLOGY (Metabolic Diseases) (Grade II—Clinical) for a period of 1 year in the first instance. Salary scale £700–£1700 ; F.S.S.U. and family allowance. The successful candidate will be required to take up duty not later than 1st October, 1956. In addition to teaching responsibilities, the duties include investigation and supervision of patients with renal and other forms of metabolic diseases.

Applications (6 copies), with names of 2 referees, should be sent by 1st September, 1956, to the Assistant Registrar, the Medical School, Birmingham, 15, from whom further particulars may be obtained. G. L. BARNES, Secretary.

The University, Birmingham, 15, August, 1956.

EXAMINING BOARD IN ENGLAND

by the ROYAL COLLEGE OF PHYSICIANS OF LONDON and the ROYAL COLLEGE OF SURGEONS OF ENGLAND

Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN CHILD HEALTH
19th September
DIPLOMA IN MEDICAL RADIOTHERAPY
11th October
DIPLOMA IN MEDICAL RADIO-DIAGNOSIS
Part II—25th October

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

UNIVERSITY OF LONDON

(BRITISH POSTGRADUATE MEDICAL FEDERATION)
INSTITUTE OF NEUROLOGY
(Queen-square)

A COURSE OF LECTURES on "Infection and Infestation of the Central Nervous System" will be given in the Lecture Theatre at The National Hospital, Queen-square, W.C.1, on WEDNESDAYS at 5.30 P.M. from 3RD OCTOBER to 19TH DECEMBER, 1956.

Details of the course will be published later.

ROYAL COLLEGE OF SURGEONS OF ENGLAND. Applications are invited for the full-time post of FIRST ASSISTANT (Senior Lecturer grade) in the new Research Department of Anæsthetics. Applicants should be medically qualified, and should have had experience in physiological research. Starting salary will be in the range £1250–£1750 according to qualifications and experience. The post is superannuable and a family allowance is payable.

Applications in writing (2 copies), giving details of qualifications and experience, together with the names of 2 referees, should be sent to Mr. W. F. DAVIS, Secretary, Faculty of Anæsthetists, Royal College of Surgeons, Lincoln's Inn-fields, London, W.C.2, by 12th September, 1956.

INSTITUTE OF MEDICAL AND VETERINARY SCIENCE, ADELAIDE, SOUTH AUSTRALIA. Applications are invited for an appointment as CLINICAL PATHOLOGIST at the Institute. The duties may include some clinical hæmatology but are chiefly concerned with surgical histopathology. There are 7 medical graduates in the Division of Clinical Pathology which carries out examinations for hospitals and private practitioners. There is an opportunity for carrying out special investigations. The laboratories are modern and well equipped. The appointment is for 3 years in the first instance, but may be renewed or may be made permanent. The salary is within the range £A1776–£A2176 for an applicant with some preliminary experience, but a more senior applicant would be placed in the range £A2176–£A2626.

Further particulars may be obtained from the Director, P.O. Box 14, Rundle-street, Adelaide, to whom applications should be submitted before 28th September, 1956.

D. G. DAVIES, Secretary.

THE UNITED CARDIFF HOSPITALS. Medical Professorial Unit. Research Fellowship. Applications are invited for appointment to a RESEARCH FELLOWSHIP IN MEDICINE in the Professorial Unit of the Welsh National School of Medicine at the Cardiff Royal Infirmary. The appointment, at a salary of £1100 p.a. with superannuation, is normally tenable for a period of 2 years. The person appointed will be able to take part in the teaching and routine work of the Department.

Further particulars about this appointment, and forms of application are available from the Secretary to the Board at the Cardiff Royal Infirmary, Cardiff. Applications should be returned by 31st August.

THE UNIVERSITY OF MANCHESTER. Applications for the post of LECTURER IN SOCIAL AND PREVENTIVE MEDICINE are invited from registered medical practitioners. The post is a joint appointment between the University and the Lancashire County Council, whereby the person appointed, in addition to carrying out lecturing duties at the University, will carry out duties normally associated with an Assistant Divisional Medical Officer in the neighbouring area in the County. Salary on a scale rising to £2000 p.a. with membership of F.S.S.U. and children's allowance scheme. Initial salary fixed according to qualifications and experience.

Applications should be sent not later than 14th September, 1956, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

ANATOMY DEPARTMENT, DALHOUSIE UNIVERSITY, HALIFAX, NOVA SCOTIA, CANADA. Applications are invited for an ASSISTANT PROFESSOR in the Department of Anatomy. Experience in teaching and research in embryology and histology, or in neuro-anatomy, is essential and a working knowledge of gross anatomy desirable. Candidates with a medical degree will be preferred, although those with an Honors Degree in Medical Science or Biology will receive special consideration. The minimum salary for a medical graduate will be $5000. The salary will depend on qualifications and experience.

Applications to be made to Prof. R. L. DEC. H. SAUNDERS at the above address.

Hospital Services : Senior Appointments

COLCHESTER. ESSEX COUNTY HOSPITAL. Locum RADIOLOGIST (Consultant or Senior Hospital Medical Officer grade) required from 24th August for 6 weeks, for duties at hospitals in the Colchester Group.

Applications to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT PÆDIATRICIAN (Female) (1 half-day per week) at the Annie McCall Maternity Hospital, S.W.4.

Applications by letter (5 copies), giving date of birth, qualifications, experience, names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 15th September, 1956. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST (4 half-days per week) for the Wandsworth Group. Duties mainly at St. James' Hospital, S.W.12, and Weir Maternity Hospital, S.W.12.

Applications by letter (5 copies), giving date of birth, qualifications, experience, names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 15th September, 1956. Applicants may visit hospitals by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Part-time CONSULTANT OBSTETRICIAN AND GYNÆCOLOGIST (Female) (4 half-days per week) at the South London Hospital for Women and Children, Clapham Common, S.W.4.

Applications by letter (5 copies), giving date of birth, qualifications, experience, names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 15th September, 1956. Applicants may visit Hospital by local arrangement.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

Birmingham (Selly Oak) Group

Whole-time CONSULTANT in Anæsthetics. Duties mainly at Selly Oak Hospital.

Birmingham (Selly Oak) Group

SENIOR CONSULTANT ANÆSTHETIST. Whole-time in charge of anæsthetic services—Little Bromwich General Hospital (158 general beds increasing to 476 ; 214 for infectious diseases), centre for treatment of poliomyelitis cases. Experience respiratory problems of poliomyelitis an advantage.

Dudley and Stourbridge Group

Part-time CONSULTANT ANÆSTHETIST (9 notional half-days weekly). Duties mainly at Guest Hospital, Dudley (154 Beds) ; also at Wordsley Hospital (372 Beds) ; Corbett Hospital, Stourbridge (106 Beds).

Part-time CONSULTANT ANÆSTHETIST (8 notional half-days weekly). Duties at Wordsley Hospital (6 notional half-days) and Corbett Hospital (2 notional half-days).

Lichfield, Sutton Coldfield and Tamworth Group

Part-time CONSULTANT ANÆSTHETIST (8 notional half-days weekly). Duties at Sutton Coldfield (3 notional half-days), Tamworth (3 notional half-days), Victoria (1 notional half-day) and Hammerwich (1 notional half-day) Hospitals, Lichfield.

All posts experience specialty and D.A. (Parts I and II) or F.F.A.R.C.S. required.

Applications (15 copies), naming 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, by 3rd September, 1956.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ASSISTANT CHILD PSYCHIATRIST (whole-time) in the Cambridge area. Duties will be predominantly at the Cambridge Child Psychiatric Clinic and branch clinics in the area and by agreement with the Board of Governors will include work in the Psychiatric Outpatient Department of Addenbrooke's Hospital. Wide experience and higher qualification necessary. Salary scale £1575–£2025.

Applications (8 copies), stating age, experience, and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 27th August, 1956. Candidates invited to visit by arrangement with Consultant Child Psychiatrist, Chesterton Hall, Chesterton-road, Cambridge.

LANCASTER MOOR HOSPITAL, Lancaster. (Regional MENTAL HOSPITAL.) Locum ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer) required from 1st August, 1956, for several weeks. Previous psychiatric experience essential. Salary according to national scale and at present 31½ guineas per week, less residential charges. Accommodation for single person only.

Apply Medical Superintendent.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time or maximum Part-time Additional CONSULTANT RADIOLOGIST to the Blackburn and District Hospitals (Blackburn Royal Infirmary, Queen's Park Hospital, Blackburn, and Victoria Hospital, Accrington, &c.). Wide experience and higher qualifications essential.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 27th August, 1956.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ASSISTANT OPHTHALMOLOGIST (5 half-days a week), Senior Hospital Medical Officer grade, at Hillingdon Hospital, Uxbridge (621 Beds). A higher Diploma in Ophthalmology necessary. Hospital may be visited by arrangement with Medical Director.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, before 17th September, 1956.

LIVERPOOL REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens ANÆSTHETIST (Senior Hospital Medical Officer grade) required for approximately 2 years, with duties in the North Liverpool, East Liverpool and Liverpool Region Children's Groups.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 1st September, 1956.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL REGIONAL HOSPITAL BOARD. Aintree AND WALTON HOSPITALS. Applications are invited for the post of Whole-time ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer) with duties at the above hospitals. Aintree Hospital is a Chest Hospital of 550 Beds and Walton Hospital an acute general hospital of 1300 Beds with an associated Neurosurgical Unit. Applicants should possess a Diploma in Radiology and have wide experience in radiology.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 8th September, 1956.

VINCENT COLLINGE, Secretary to the Board.

NEWCASTLE REGIONAL HOSPITAL BOARD. Durham AND NORTH-WEST DURHAM HOSPITAL MANAGEMENT COMMITTEES. (Main hospitals : Dryburn, 300 Beds ; County, 116 Beds—Durham. Shotley Bridge General, 530 Beds ; Maiden Law, 108 Beds.) 2 CONSULTANT E.N.T. SURGEONS, whole-time or maximum part-time for a minimum of 9 notional half-days each per week. 1 of the appointees will be designated senior. Appointees will be required to work as a team in these Management Committee areas and to reside 1 in each area.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne 6, within 28 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Durham HOSPITAL MANAGEMENT COMMITTEE. (Main Hospitals : County, 116 Beds ; Dryburn, 292 Beds ; Chester-le-Street General, 204 Beds.) CONSULTANT RADIOLOGIST, whole-time, or maximum part-time for 9 notional half-days per week.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners with wide hospital, general and administrative experience for the whole-time post of SENIOR ADMINISTRATIVE MEDICAL OFFICER to the Board. The officer appointed will be required to act as adviser to the Board on the planning organisation and staffing of the Hospital and specialist services of the Region and will also carry out such other administrative and executive functions as the Board may assign to him. Salary £2250–£115(5)–£2825. Whitley Council terms and conditions of service will apply. It is intended that the person appointed should assume duty on 1st April, 1957.

Applications, stating age, qualifications, experience and present post, together with the names and addresses of 2 referees, should be lodged not later than 19th September, 1956, with the Secretary of the Board, P.O. Box No. 28, 1, Albyn-place, Aberdeen. Canvassing, whether direct or indirect, will disqualify.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of Whole-time ASSISTANT RADIOLOGIST based at the Dumfries and Galloway Royal Infirmary. Salary (at age 32 and over) on the scale £1575–£50–£2025. This appointment is subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SHEFFIELD REGIONAL HOSPITAL BOARD. Part-time ASSISTANT OPHTHALMOLOGIST required for 3 notional half-days per week, with duties in school clinics in Derby. To work under the direction of the Consultant. Post vacant 25th December, 1956. Salary within Senior Hospital Medical Officer scale.

Application forms and further details from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 8th September, 1956.

SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT RADIOLOGIST for Derbyshire Royal Infirmary to work under the direction of the Consultant Radiologist-in-charge. Candidates should possess a Diploma in Radiology. Salary scale £1575–£50–£2025.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 15th September, 1956.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires a Locum Tenens ANÆSTHETIST of Consultant grading for 4 half-days per week for the Bournemouth and East Dorset Group of hospitals immediately for approximately 6 months. Candidates should possess higher qualifications and should have had considerable experience in anæsthesia.

Applications (3 copies), stating age, qualifications and experience, and giving names and addresses of 2 referees, to the Area Secretary, "Highcroft," Romsey-road, Winchester, by 29th August, 1956.

WELSH REGIONAL HOSPITAL BOARD. Consultant OBSTETRICIAN AND GYNÆCOLOGIST to serve Cardiff Hospital Management Committee. Further details may be obtained on application. Optional whole-time/maximum part-time appointment.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

WELSH REGIONAL HOSPITAL BOARD. Consultant OBSTETRICIAN AND GYNÆCOLOGIST to serve Rhymney and Sirhowy Valleys Hospital Management Committee. Further details may be obtained on application. Optional whole-time/maximum part-time appointment.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 21 days.

CANADA. UNIVERSITY OF ALBERTA HOSPITAL, EDMONTON, ALBERTA, CANADA, requires ASSISTANT SUPERINTENDENT (medical). Starting salary $7800 p.a. Annual increments of $500 to $9800.

Give full particulars, name referees, and enclose photograph first letter, to A. C. MCGUGAN, M.D., Superintendent.

University of Alberta Hospital, Edmonton, Alberta, Canada.

VIRGINIA, U.S.A. Progressive state mental hospital (4600 Beds) in Virginia expanding staff invites applications for PHYSICIANS at all levels, psychiatric experience desirable but not necessary. Salary from $8040 (approximately £2750). All modern methods of treatments. Opportunities for research. Good retirement plan.

Apply to BRIAN C. CAMPDEN-MAIN, M.R.C.S. Send full résumé in first letter. Box 271, Petersburg, Virginia, U.S.A.

Hospital Services : Junior Appointments

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. HOUSE PHYSICIAN (House Officer grade), resident, not pre-registration.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

BERNHARD BARON MEMORIAL RESEARCH LABORATORIES. QUEEN CHARLOTTE'S MATERNITY HOSPITAL. A REGISTRAR is required at the above laboratories. Previous specialised experience is not essential. The successful candidate will receive training in serology and bacteriology, and may later assist in the research work. The post is resident.

Applications to the House Governor to the Board of Governors by 5th September on forms obtainable from 339, Goldhawk-road, London, W.6.

BOLINGBROKE HOSPITAL, Wandsworth Common, S.W.11. HOUSE PHYSICIAN (resident), vacant 15th September, 1956. Open to registered practitioners and pre-registration candidates.

Apply Hospital Secretary, enclosing copies of 3 recent testimonials, by 29th August, 1956.

BROMPTON HOSPITAL, S.W.3. Applications invited for post of MEDICAL REGISTRAR (whole-time). Salary within the Registrar grade. The appointment is for 1 year, commencing 1st October, 1956, with eligibility for reappointment. Candidates must hold the M.R.C.P. Diploma or the M.B. of a University.

Applications, stating age, qualifications with dates nationality and appointments held, together with copies of testimonials, by 8th September, to KENNETH A. F. MILES, House Governor.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required, whole-time, resident when on duty. Post vacant 1st September, 1956. Appointment for 1 year in first instance, will include outpatient sessions and teaching. Hospital may be visited by direct appointment.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 28th August, 1956.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR (general) required at above Hospital, with duties mainly in Geriatric Department. This involves close liaison with general practitioners, and home visiting of patients. Whole-time. Non-resident except when on duty. Post vacant 30th November, 1956. Applicants may visit Hospital by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, within 10 days.

COLINDALE HOSPITAL, Colindale-avenue, London, N.W.9. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time MEDICAL REGISTRAR (resident or non-resident) required at above Hospital which accommodates 300 tuberculosis patients. Experience in diseases of the chest desirable. The Hospital, which is within easy access of the centre of London, may be visited by direct appointment with the Physician-Superintendent.

Application forms obtainable from, and returnable to, the Group Secretary, Edgware General Hospital, Edgware, by 28th August, 1956.

FOUNTAIN GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. A REGISTRAR is required to assist in research in the pathology of mental deficiency at the Fountain Hospital Department of Neuropathology. Training will be given to a suitable candidate. The Fountain Hospital Group has 800 Beds, mainly for children. Canvassing will disqualify but candidates may visit the Hospital by appointment and the annual report is available on application.

Application forms from Secretary, Fountain Hospital, Tootinggrove, London, S.W.17. Completed application forms should reach Secretary by 31st August, 1956.

GERMAN HOSPITAL, Dalston, E.8. (General—157 Beds.) Applications for the 6 months resident appointment of registered HOUSE SURGEON (obstetrics and gynæcology), post now vacant, should be sent to Group Secretary, Hackney Hospital, London, E.9, quoting GH/HSO.

GUY'S HOSPITAL, YORK CLINIC FOR PSYCHOLOGICAL MEDICINE. Required, RESIDENT HOUSE PHYSICIAN (Senior House Officer), to commence duties on 1st October, 1956. The post offers good opportunities for postgraduate study. Salary in accordance with the terms and conditions of service for House Officers in the National Health Service. Appointment for 6 months in the first instance, and may be renewed for a further period of 6 months.

Applications, with copies of 2 testimonials, should be sent to the Superintendent, Guy's Hospital, London Bridge, S.E.1, within 2 weeks of the date of the appearance of this advertisement

GUY'S HOSPITAL, S.E.1. Applications are invited for the post of Part-time REGISTRAR in the Dermatological Department at Guy's Hospital with attendance on 7 sessions per week. The appointment will be for 1 year in the first instance from 1st October, 1956.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 24th August, 1956.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6 months appointment from 3rd September of Pre-registration HOUSE PHYSICIAN should be sent by 25th August to Secretary, above address, quoting HH/PHP.

HENDON DISTRICT HOSPITAL, 357, Hendon-way, Hendon, N.W.4. Applications are invited from General Medical Practitioners, whose practices are within the Borough of Hendon, for appointment to the Medical Staff at above Hospital. Members of the Medical Staff have access to the general and private beds for the admission and treatment of their own patients and to such outpatient facilities as at present exist or can be provided by existing staff and accommodation. They may be required to undertake on roster duties the treatment of patients admitted under emergency arrangements who are not patients of other members of the staff. Further details may be obtained from the Hon. Medical Superintendent of the Hospital.

Applications should be addressed to the Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, not later than 8th September, 1956.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, London, N.21. SENIOR HOUSE OFFICER (resident) for Tuberculosis Unit (100 Beds).

Applications, with copies of 3 testimonials, to Hospital Secretary.

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the post of SENIOR REGISTRAR in Ophthalmology at the Royal Eye Hospital. Applicants should hold a higher medical qualification and have had previous experience in an ophthalmic post. The appointment, which is subject to the terms and conditions of service for medical and dental staffs, will be tenable from 1st October, 1956, for 1 year in the first instance, subject to reappointment.

Applications, stating age, education, qualifications and experience, with the names of 2 referees, should be sent to the undersigned by 28th August, 1956.

S. W. BARNES, House Governor.

LAMBETH HOSPITAL, Kennington, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the position of RESIDENT HOUSE PHYSICIAN falling vacant on 3rd October, 1956. The successful applicant will be required to carry out a fortnight's locum duty starting on 20th September, 1956.

Application forms from the Physician-Superintendent. A stamped addressed envelope should be enclosed.

LONDON CHEST HOSPITAL. Hospitals for Diseases OF THE CHEST. A vacancy occurs for RESIDENT ASSISTANT PHYSICIAN at the Country Branch, Ariesey, near Letchworth. Appointment for 1 year from 1st November, 1956, and renewable. Post graded as Senior Registrar.

Applications, stating age, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned, from whom further particulars may be obtained, by 15th September.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

NATIONAL HOSPITALS FOR NERVOUS DISEASES. Applications are invited from registered medical practitioners for the appointment of ANÆSTHETIC REGISTRAR (resident). This post carries the grade of Registrar.

Applications, giving the names of 3 referees, to be sent to the undersigned not later than 27th August, 1956.

H. EWART MITCHELL, Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, London, W.C.1.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. HOUSE PHYSICIAN (post-registration), resident, required for 1st October for 6 months. General medicine.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 28th August.

QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS. ANÆSTHETIST (Senior House Officer), resident post tenable for 6 months, from a date in September to be arranged, in the first instance, for duties at both hospitals. Post recognised for the purpose of the F.F.A.R.C.S.

Applications to the House Governor by 27th August on forms obtainable from 339, Goldhawk-road, London, W.6.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. HOUSE OFFICER. Appointment will be made for 2 consecutive periods of 6 months commencing 1st October, 1956. First period as House Physician and second as House Surgeon and Casualty Officer.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned, with copies of not more than 3 testimonials, on or before 25th August, 1956.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. Applications are invited for the appointment of RESIDENT MEDICAL OFFICER (Male or Female), graded Senior House Officer, at Hackney-road, to become vacant 1st October, 1956. Candidates must have had experience in the treatment of sick children. The appointment will be for 1 year.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned, with copies of not more than 3 testimonials, not later than 27th August, 1956.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15.

PÆDIATRIC HOUSE PHYSICIAN, commencing 17th September, 1956.

HOUSE SURGEON (post-registration), commencing 16th September, 1956.

SENIOR OBSTETRIC HOUSE SURGEON (Senior House Officer grade), commencing 1st October, 1956.

JUNIOR OBSTETRIC HOUSE SURGEON (post-registration), commencing 1st October, 1956.

Applications, with copies of recent testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 25th August, 1956.

QUEEN MARY'S HOSPITAL FOR THE EAST END, West Ham-lane, Stratford, London, E.15. JUNIOR CASUALTY OFFICER (House Officer third post) required immediately for 6 months.

Applications, with copies of testimonials, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15, by 28th August, 1956.

ROYAL FREE HOSPITAL, W.C.1. Applications are invited for the post of REGISTRAR to the X-ray Department at the Royal Free Hospital. The post is non-resident for 1 year in the first instance. Duties to commence 1st October, 1956. Candidates should be registered medical practitioners of not more than 10 years standing and should hold the D.M.R.(D.).

Formal applications, giving details of experience, &c., together with 3 testimonials, should be sent to the Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 1st September, 1956.

ROYAL FREE HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR to the X-ray Department at the Royal Free Hospital. The post is non-resident for 1 year in the first instance. Duties to commence 1st October. Candidates should be registered medical practitioners of not more than 10 years standing and should hold the D.M.R.(D).

Formal applications, giving details of experience, &c., together with names of 3 referees, should be sent to the Secretary to the Board of Governors, Royal Free Hospital, Gray's Inn-road, W.C.1, not later than 1st September.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1, with which is associated the Institute of Laryngology and Otology (University of London). General Practitioner CLINICAL ASSISTANTS and OUTPATIENT ASSISTANTS. These appointments give those engaged in general practice who are able to attend for 2 sessions weekly over a period of 15 months commencing in October, 1956, the opportunity of widening their clinical experience in the specialty. At the end of 3 months training period the holders will be appointed as Outpatient Assistants with remuneration under paragraph 10(*b*) of the National Health Service terms and conditions of service.

Further particulars may be obtained from the House Governor.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time appointment as RESIDENT MEDICAL OFFICER to fill a vacancy in the approved establishment at the Seamen's Group of hospitals, available on 1st November, 1956. The successful candidate will be required to reside at the Dreadnought Seamen's Hospital, Greenwich, S.E.10. The salary will be £965 p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 1st September, 1956.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1, and NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in General Medicine to be held for 2 years at St. Bartholomew's Hospital; a third year at either St. John's Hospital in the Chelmsford Group, or the Essex County Hospital in the Colchester Group; for a fourth year at research and/or in a special unit. The appointment is tenable this Autumn and is subject to annual re-election.

Applications (10 copies), together with the names of 3 referees, should be submitted to the undersigned within the next 14 days.

C. C. CARUS-WILSON, Clerk to the Governors.

St. Bartholomew's Hospital, E.C.1.

ST. GILES' HOSPITAL, Camberwell, S.E.5. Applications invited for appointment as SENIOR HOUSE OFFICER (casualty duties). Recognised for F.R.C.S. Vacant 16th September. Resident or non-resident.

Apply, giving details of age, qualifications and previous posts, with copy testimonials or names of referees, to Group Secretary, Dulwich Hospital, S.E.22, by 27th August.

ST. JAMES' HOSPITAL, Balham, S.W.12. Senior House OFFICER (anæsthetics) required immediately. Post recognised for D.A. and F.F.A.R.C.S.

Applications, stating age, qualifications, experience and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address. (42729.)

ST. JAMES' HOSPITAL, Balham, S.W.12. Part-time CLINICAL ASSISTANT (E.N.T.) required for 2 sessions per week (Monday morning and Thursday afternoon). Salary £175 p.a. per session.

Applications in writing, stating age, qualifications, experience and names of 2 referees, to Group Secretary at above address by 8th September. (42728.)

ST. JAMES' HOSPITAL, Balham, S.W.12. House Surgeon (general surgery). Post recognised for F.R.C.S.

Applications, stating age, qualifications, experience and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address by 29th August. (42736.)

ST. MARY'S HOSPITAL, W.2, and the NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. (Combined appointment.) Applications are invited for the post of SENIOR REGISTRAR in Morbid Anatomy. The successful candidate will be required to take up his duties as soon as possible and will work during the first 2 years of his appointment in the new laboratories at Paddington General Hospital, where his duties will be concerned with autopsies and surgical pathology for Paddington General and St. Charles' Hospitals. The third and fourth years will be spent in the Department of Morbid Anatomy at St. Mary's Hospital.

Applications, stating nationality, date of birth, permanent address, qualifications with dates and details of National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, St. Mary's Hospital, W.2, not later than 29th August, 1956.

ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, Upper-road, Plaistow, London, E.13. HOUSE SURGEON (pre-registration) to commence 1st September, 1956.

Apply to Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15.

ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. House OFFICER (Orthopædic, Fracture and Casualty Departments), vacant now. Recognised for F.R.C.S. 6 months resident post-registration appointment providing good general experience in a busy acute general hospital.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior REGISTRAR to the Department of Physical Medicine for a period of 1 year in the first instance.

Applications, naming 2 referees, to the Clerk of the Governors by 7th September, 1956.

ST. THOMAS'S HOSPITAL, London, S.E.1. Senior REGISTRAR to the Ophthalmic Department for a period of 1 year in the first instance from 22nd October, 1956, to carry out 5 half-day sessions per week.

Applications, naming 2 referees, to the Clerk of the Governors by 31st August, 1956.

ST. THOMAS'S HOSPITAL, London, S.E.1. Part-time REFRACTIONIST for a period of 1 year in the first instance, to carry out 2 half-day sessions per week on Monday and Thursday afternoons. £175 p.a. per weekly session.

Applications, naming 2 referees, to the Clerk of the Governors by 31st August, 1956.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of CLINICAL ASSISTANT to the Department of Psychological Medicine to attend 5 half-days a week, graded General Practitioner (salary £175 p.a. per half-day) from 1st November, 1956.

Applications, with names of 2 referees, to Administrator and Secretary by 3rd September, 1956.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, London, W.C.1. Applications are invited for 3 MEDICAL REGISTRARSHIPS; these appointments will include a period of duty at the Whittington Hospital, London, N.19, and will be for 1 year in the first instance from 1st October, 1956, or as soon thereafter as possible. Preference will be given to candidates holding higher qualifications.

Applications, with the names of 2 referees, to Administrator and Secretary by 29th August, 1956.

WEST HAM GROUP HOSPITAL MANAGEMENT COMMITTEE, Stratford, London, E.15. RESIDENT ANÆSTHETIST (Senior House Officer) immediately for 12 months. 6 months each East Ham Memorial and Queen Mary's Hospitals. Combined post recognised for F.F.A.R.C.S.

Applications with copies of testimonials to Group Secretary, West Ham Group Hospital Management Committee, by 23rd August.

WHITTINGTON HOSPITAL, London, N.19. Applications are invited for the following appointments:—

*HOUSE PHYSICIAN (general medicine), 5 posts. Recognised for M.D.(Lond.).

*HOUSE PHYSICIAN (pædiatric). Recognised for M.D. (Lond.) and D.C.H.

*HOUSE PHYSICIAN (geriatric).

†HOUSE SURGEON (general surgery), 3 posts. Recognised for F.R.C.S.(Eng.).

*HOUSE SURGEON (obstetric), 2 posts. Recognised for M.R.C.O.G. in obstetrics.

All posts vacant 1st October, 1956.

*Pre-registration candidates who have already held a first appointment may apply.

†Pre-registration candidates may apply.

Application forms obtainable from the Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6 (ARC. 3070—Ext. 24), and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 27th August, 1956.

WHITTINGTON HOSPITAL. Clinical Assistant (General Practitioner) required at above Hospital to assist in Skin Outpatient Clinic 2 hours weekly (Tuesday morning).

Application forms obtainable from Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, and returnable to the Medical Superintendent, Whittington Hospital, London, N.19, by 27th August.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICERS (anæsthetics). 1 at St. Nicholas Hospital, Plumstead, vacant now, and 1 at Memorial Hospital, Woolwich, vacant now. Both posts recognised for F.F.A.R.C.S. and are for 6 months in the first instance and may be renewed. Possession of D.A. an advantage.

Apply to Group Secretary, Memorial Hospital, Shooters Hill Woolwich, S.E.18.

WANSTEAD HOSPITAL, Harmon Hill, London, E.11. (191 Beds.) HOUSE SURGEON required. Post vacant 15th September, 1956. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Harmon Hill, E.11. (191 Beds.) Applications are invited for the post of CASUALTY OFFICER (recognised for F.R.C.S.) graded Senior House Officer, vacant 5th September, 1956. Salary £745 p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, to be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

WHIPPS CROSS HOSPITAL, Leytonstone, E.11. Applications are invited for the posts of HOUSE SURGEON (post-registration) and HOUSE SURGEON (pre-registration) in the Orthopædic Department. Posts recognised for the F.R.C.S. Vacant now.

Application forms from the Hospital Secretary to be returned by 27th August.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the appointment of a HOUSE SURGEON in the Thoracic Surgery Wards of Woodend General Hospital, Aberdeen, for a period of 6 months from 1st August, 1956, to 31st January, 1957. The post is a resident one and is approved as a pre-registration post for provisionally registered practitioners.

Applications with full details, and giving the names of 2 referees, should be lodged immediately with the Secretary, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the appointment of a HOUSE SURGEON in the E.N.T. Department of the Aberdeen Royal Infirmary for a period of 6 months from 1st August, 1956, to 31st January, 1957. The post is a resident one. The appointment is approved as a pre-registration post and tenure for the prescribed period will count towards full registration on the Medical Register for provisionally registered practitioners.

Applications, with full details, and giving the names of 2 referees, should be lodged immediately with the Secretary, Aberdeen General Hospitals, P.O. Box 92, 62, Queen's-road, Aberdeen.

ALTON, HAMPSHIRE. LORD MAYOR TRELOAR ORTHOPÆDIC HOSPITAL. Applications are invited from registered medical practitioners for the post of Whole-time ORTHOPÆDIC REGISTRAR. Post provides experience in non-pulmonary tuberculosis and general orthopædics and includes attendances at peripheral clinics. House available for married man and quarters for single man. Visit to Hospital welcomed.

Apply Secretary for form.

ALTON, HAMPSHIRE. LORD MAYOR TRELOAR ORTHOPÆDIC HOSPITAL. Required immediately Locum ORTHOPÆDIC REGISTRAR for holiday duty—probably 3 months; post provides experience in non-pulmonary tuberculosis and general orthopædics. Accommodation for single man now—for married man possibly later. Visit to Hospital welcomed.

Apply Secretary.

ALTON. HENRY GAUVAIN HOSPITAL. Lord Mayor TRELOAR GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of Whole-time REGISTRAR in hospital of 114 Beds for surgery, non-pulmonary tuberculosis and orthopædics. Post vacant early in September for 1 year, renewable for a second. Preference given to candidates holding F.R.C.S. Person appointed to act as Deputy to Surgeon-Superintendent. Residence in house near Hospital can probably be provided for married man.

Write for application form to the Secretary, Lord Mayor Treloar Group Hospital Management Committee, Treloar Hospital, Alton, Hants.

BEDFORD GENERAL HOSPITAL. (439 Beds.) Locum ANÆSTHETIC REGISTRAR required 3 months commencing September or shorter period. Salary £17 10s. per week.

Applications and testimonials to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEXLEY HOSPITAL, Dartford Heath, Bexley, Kent. BEXLEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER at above Hospital. Salary £745 p.a., with deductions of £150 p.a. for board, lodging, &c., if resident. The Hospital (2300 Beds) deals with all types of psychiatric illness and experience in all modern physical, occupational and psychotherapeutic procedure is available. Opportunities will be available to assist at out-patient clinics.

Applications, with names and addresses of 3 referees, should be sent to the Physician-Superintendent, Dr. L. C. COOK, M.D., D.P.M., within 14 days of the appearance of this advertisement.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, WESTBOURNE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a RESIDENT MEDICAL OFFICER of Registrar grade for E.N.T. and ophthalmic duties. The post becomes vacant on 31st August, 1956. In addition to duties at the above Hospital, the successful candidate will be required to assist in the E.N.T. and ophthalmic outpatient clinics at the Royal Victoria Hospital, Shelley-road, Boscombe, and the Poole General Hospital, Poole. The appointment is recognised for the D.O. and D.L.O. Diplomas and there is ample opportunity for studying for these.

Forms of application which may be obtained from the Group Secretary, Hospital Management Committee Office, Royal Victoria Hospital, Gloucester-road, Boscombe, Bournemouth, should be returned to him, duly completed, within 14 days of the appearance of this advertisement.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (resident), orthopædic and casualty combined. The post which is now vacant is recognised for the F.R.C.S. examination and is normally tenable for 12 months.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of 2 HOUSE PHYSICIANS vacant 18th and 20th September. The appointments are recognised for pre-registration purposes.

Applications to the Hospital Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) ORTHOPÆDIC HOUSE SURGEON (first, second, or third post). Married accommodation available. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S. Vacant now.

Apply Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) HOUSE PHYSICIAN (House Officer or Senior House Officer grading according to experience), vacant end of September. Pre-registration post but fully qualified practitioners may apply.

Applications to Group Secretary.

BIRMINGHAM AND MIDLAND EYE HOSPITAL, Church-street, BIRMINGHAM, 3. HOUSE SURGEON required. Appointment for 6 months, but renewable. Hospital carries resident staff of 5 and provides a 2-year course of instruction. Recognised for the D.O. (England) and F.R.C.S. (England) in Ophthalmology. Wide experience available in all branches, including surgery.

Detailed applications by 25th August, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. (780 Beds.) HOUSE SURGEON required. Recognised for pre-registration and F.R.C.S. Unit of approximately 85 adult and children's general surgical beds under control of 2 Consultant Surgeons.

Detailed applications, with copies of 3 recent testimonials, to Group Secretary.

BIRMINGHAM [illegible]. LITTLE BROMWICH GENERAL HOSPITAL. HOU[illegible] SURGEON (Male/Female). Post vacant 12th September, 1956. Recognised as pre-registration appointment.

Apply Physician-Superintendent with copies of 2 testimonials or names of referees.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) **Coventry Group No. 20, Stoney Stanton-road, Coventry**

REGISTRAR (orthopædic and general surgery), for Manor Hospital, Nuneaton (125 Beds). Experience specialties essential. Higher qualification desirable. Resident. Married quarters available.

(2) **Stoke-on-Trent Group, Princes-road, Stoke-on-Trent**

(*a*) REGISTRAR (chest diseases) for Cheshire Joint Sanatorium (305 Beds). Experience general medicine required.

(*b*) REGISTRAR (E.N.T. surgery) for North Staffordshire Royal Infirmary. Experience specialty essential. Resident or non-resident.

(3) **Walsall Hospital Management Committee, Walsall General Hospital, Walsall**

REGISTRAR (general medicine), resident. Duties mainly at Manor Hospital. Experience specialty essential.

Application forms from Group Secretaries, to be returned before 27th August, 1956.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE BIRMINGHAM MATERNITY HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT OBSTETRIC HOUSE SURGEON vacant 1st November, 1956. The appointment is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Application forms obtainable from the House Governor, the Birmingham and Midland Hospitals for Women, Showell Green-lane, Sparkhill, Birmingham, 11, to be returned not later than 1st September, 1956. G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS and THE BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications are invited for 2 joint appointments of SENIOR REGISTRAR in Anæsthetics (non-resident). In these 2 new appointments facilities will be available for training and experience in anæsthesia for neurosurgery, plastic surgery and thoracic surgery in addition to general anæsthetic duties, and time will be equally divided between the 2 Boards.

(1) Neurosurgery, plastic surgery and general anæsthetic duties in the Queen Elizabeth Hospital and other hospitals in the Teaching Group and thoracic surgery at Hill Top, Yardley Green and St. Wulstan's Hospitals.

(2) Neurosurgery, plastic surgery and general anæsthetic duties in the Queen Elizabeth Hospital and other hospitals in the Teaching Group and general anæsthetic duties at Little Bromwich General Hospital, in which is a centre for the treatment of poliomyelitis cases with respiratory involvement, and other regional hospitals.

Possession of the 2-Part Diploma in Anæsthetics of the Conjoint Examining Board of England or the Diploma of Fellow of the Faculty of Anæsthetists of the Royal College of Surgeons of England would be desirable.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned to him not later than 8th September, 1956.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of NON-RESIDENT REGISTRAR in Dermatology (Registrar grade) for duty in the above hospitals. Tenable for 1 year in the first instance. Candidates must be registered medical practitioners and should have held a resident hospital appointment in medicine and surgery. The possession of the M.R.C.P. will be an advantage.

Forms of application may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Edgbaston, Birmingham, 15, and should be returned to him not later than 25th August, 1956.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. RESIDENT MEDICAL OFFICER (Senior House Officer), vacant mid-September. Residential charge £157 p.a. General Hospital with 5 other Resident Medical Officers.

Apply Medical Superintendent.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (955 equipped beds.) ASSISTANT CASUALTY OFFICER (Senior House Officer), resident or non-resident. Residential charge £167 p.a. Recognised for F.R.C.S.

Apply, giving qualifications, experience and age, with copies of 3 recent testimonials, to Medical Superintendent.

BIRMINGHAM. THE SKIN HOSPITAL. Inpatients' DEPARTMENT, George-road, BIRMINGHAM, 15. SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience. Modern well-equipped Inpatients' Department, providing facilities for study of skin diseases. Required to assist Consultant at outpatient clinics.

Applications, with copies of 2 recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

BLACKBURN. QUEEN'S PARK HOSPITAL. (640 general beds.) SENIOR HOUSE OFFICER (medicine) required 4th October, for acute medical unit.

Apply to Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN. ROYAL INFIRMARY. (262 acute beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (general surgery) required 29th September. Recognised for F.R.C.S.

Apply Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN. ROYAL INFIRMARY. (262 general beds.) JUNIOR HOSPITAL MEDICAL OFFICER or SENIOR HOUSE OFFICER (casualty and orthopædics) required 30th August, 1956. Post recognised for F.R.C.S. Junior Hospital Medical Officer post can be for any period up to 4 years and a starting salary above the minimum of the scale may be approved on account of special experience or qualifications.

Apply to Secretary, Blackburn and District Hospital Management Committee, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. BOLTON ROYAL INFIRMARY (237 Beds), BOLTON DISTRICT GENERAL HOSPITAL (604 Beds). RESIDENT SENIOR HOUSE OFFICERS in Medicine (2), 1 for each of the above Hospitals. Both vacant early September and tenable for 12 months.

Applications, with the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. (516 Beds.) Applications invited for post of HOUSE OFFICER (orthopædic surgery). Duties include care of cases from London Hospital Orthopædic Department. First, second, third or pre-registration post; tenable for 6 months. Recognised for F.R.C.S.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. Locum REGISTRAR in Orthopædic and Renal Tuberculosis required from 1st to 28th October, 1956.

Applications to the Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

BRIGHTON. BEVENDEAN HOSPITAL, Bear-road, BRIGHTON, 7. (165 Beds.) Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital for chest diseases. Salary £775–£50–£1075 p.a.

Applications, stating age, qualifications and nationality, previous posts held, together with the names of 2 referees, should be sent to the Administrative Officer, Brighton General Hospital, Elm-grove, Brighton, 7, as soon as possible.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (312 Beds.) CASUALTY HOUSE SURGEON (1 of 3). Duties include work in Orthopædic and Traumatic Unit. Required early September. Recognised for pre-registration and F.R.C.S.

Applications, stating usual particulars and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRISTOL. SOUTHMEAD GENERAL HOSPITAL GROUP MANAGEMENT COMMITTEE. Required at Snowdon Road Hospital (300 Beds—chronic sick, general medical cases, tuberculosis and dermatology) SENIOR HOUSE OFFICER (medical) for 6 months or 12 months commencing 12th September, 1956.

Immediate applications to be made to the Group Secretary, Southmead Hospital, Bristol.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. (542 staffed beds, expanding.) Applications are invited for SENIOR HOUSE OFFICER posts in the Regional Department of Neurosurgery. These posts offer useful surgical experience and the opportunity of gaining a working knowledge of neurological diagnosis. Recognised for F.R.C.S.

Applications to the Secretary, Frenchay Hospital, quoting "N.S.F." 2 referees required.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST at Frenchay Hospital (542 Beds, general medicine and surgery and regional departments of neuro, plastic and thoracic surgery). The appointment will be made either in the House Officer grade or in the Senior House Officer grade according to qualifications and experience of the successful candidate.

Applications, naming 2 referees, to be submitted to the Group Secretary, Frenchay Hospital, Bristol, by 31st August, 1956.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE SURGEON required at the above Hospital. Post recognised for pre-registration purposes.

Apply Group Secretary.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (General Children's Hospital of 853 Beds.) SENIOR HOUSE OFFICERS (2 required), care of acute medical, rheumatism and poliomyelitis beds.

Applications, stating age, qualifications and experience, with copies of 3 testimonials, should reach the Group Secretary by 1st September, 1956.

CHELMSFORD AND ESSEX HOSPITAL. Applications are invited for the resident post of CASUALTY OFFICER (Senior House Officer). It is recognised for the F.R.C.S. and offers excellent experience in the treatment of fractures and diagnosis of acute medical and surgical emergencies. Opportunity is given for Casualty Officer to follow up his cases in the wards and to obtain operating experience in major theatre under the guidance of the Consultants or the Resident Surgical Officer. Off duty time is generous and the post is one likely to suit both an officer seeking a higher qualification in surgery or one intending General Practice. The vacancy will occur on 2nd September.

Apply Secretary, Chelmsford Hospital Management Committee, Chelmsford and Essex Hospital, Chelmsford.

CHELMSFORD. ST. JOHN'S HOSPITAL. Applications are invited from registered practitioners for the post of RESIDENT PÆDIATRIC HOUSE OFFICER (Male or Female), commencing 15th September, 1956, to work in the Pædiatric Unit of the Chelmsford Hospital Group. The Unit includes a Premature Baby Nursery of 10 Cots and a Neonatal Department in the Maternity Block of the Hospital. The Department is recognised for the D.C.H.

Applications, stating age, nationality, qualifications and experience, together with recent testimonials, should be received not later than 28th August, 1956, by the Group Secretary, Chelmsford Group Hospital Management Committee, Chelmsford and Essex Hospital, London-road, Chelmsford.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (Late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required from 28th August, 1956. 100 orthopædic beds. Senior House Officer or House Officer (Intern grade). Post recognised for F.R.C.S. and Pre-registration Service. Preference given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

CHESTERFIELD ROYAL HOSPITAL. Casualty Officer required towards mid-September at above Hospital. Post recognised for Pre-registration Service and F.R.C.S. examinations.

Apply M. H. BOONE, Secretary, Chesterfield Hospital Management Committee.

CHESTERFIELD ROYAL HOSPITAL. Senior House OFFICER required 1st October at above Hospital for Accident and Orthopædic Department. Post recognised for F.R.C.S. training and offers valuable experience. National salary and conditions.

Apply M. H. BOONE, Secretary, Chesterfield Hospital Management Committee.

CHICHESTER. GRAYLINGWELL HOSPITAL. South WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER. The post, which is a trainee post, offers wide experience in all branches of adult psychiatry, both inpatient and outpatient. In addition to 3 outpatient clinics and other extramural activities, Graylingwell Hospital has an admission-rate of over 1100 patients a year, and it has Departments of Pathology, Psychology, Electro-encephalography, Clinical Research and Neurology. The successful applicant will work under the direction of the senior medical staff and will also receive formal tuition by the Director of Research. Accommodation in the Hospital is available for a single man or woman at £170 p.a.

Applications, giving details of experience and the names of 3 referees, should be sent to the Medical Superintendent not later than 2 weeks after the appearance of this advertisement.

CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR (general surgery), Locum wanted for 1 month, possibly longer, chiefly Royal West Sussex Hospital. £24 per week. Non-resident.

Apply Group Secretary, 174, Broyle-road, Chichester.

COLCHESTER HOSPITAL MANAGEMENT COM-MITTEE. Locum REGISTRAR in Anæsthetics required for 3 weeks from 7th September for hospitals in the Colchester Group.

Applications to Group Secretary, 14, Pope's-lane, Colchester, Essex.

COVENTRY AND WARWICKSHIRE HOSPITAL, COVENTRY. ASSISTANT PATHOLOGIST (Junior Hospital Medical Officer status) required for duties mainly at Group Laboratory. Recognised D.Path. Good opportunity for experience in all branches of specialty. Salary £775–£1075 p.a.

Applications, with full details and names of 2 referees, to Group Secretary, Coventry and Warwickshire Hospital, Coventry.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of GENERAL SURGICAL AND ORTHOPÆDIC HOUSE SURGEON, which is recognised for the F.R.C.S. Diploma, becomes vacant in mid-September, 1956. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of PÆDIATRIC HOUSE PHYSICIAN, recognised for D.C.H., includes work in the ward and Outpatient Department and also provides experience in the care of the newborn. Opportunities exist for the study of preventive medicine among children and child guidance work. Post vacant at the end of September, 1956. National Health Service salary and conditions.

Applications, together with 2 testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) The post of OBSTETRIC HOUSE SURGEON, which is recognised for the M.R.C.O.G. and D.Obst. R.C.O.G. becomes vacant in mid-September, 1956. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. UNITED CARDIFF HOSPITALS (Llandough HOSPITAL) AND MEDICAL RESEARCH COUNCIL (PNEUMOCONIOSIS RESEARCH UNIT). Applications are invited for the post of REGISTRAR to spend part of his time in the Miners' Chest Diseases Treatment Centre at the above-mentioned Hospital and part in the Medical Research Council's Unit, where he will have an opportunity to assist with clinical trials. The Centre caters for all types of chest diseases.

Application forms can be obtained from the Secretary to the Board at Cardiff Royal Infirmary, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of Locum SENIOR REGISTRAR in Surgery at the Cardiff Royal Infirmary for a period of 1 year from 1st November.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR HOUSE OFFICER (non-resident) to the Casualty/Orthopædic and Fracture Departments at the Cardiff Royal Infirmary. The successful applicant will spend 8 months in the Casualty Department and 4 months in the Orthopædic and Fracture Department.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF (near). CAERPHILLY DISTRICT MINERS HOSPITAL. (226 general beds.) SENIOR HOUSE OFFICER (general surgery). Married quarters may be available.

Apply to Group Secretary, Rhymney and Sirhowy Valleys Hospital Management Committee, Central Offices, Caerphilly-road, Ystrad Mynach, Hengoed, Glam.

CARDIFF (near). PRINCE OF WALES ORTHOPÆDIC HOSPITAL, RHYDLAFAR, near CARDIFF. SENIOR HOUSE OFFICER required. Regional Orthopædic Centre for South Wales area of 220 Beds increasing to 290 and branch of 70 Beds. Outpatients clinic in Cardiff. Single accommodation at hospital at Rhydlafar.

Forms of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. SENIOR HOUSE OFFICER (resident) at Brookfields Hospital for Infectious Diseases, Poliomyelitis and Tuberculosis, with other work to be arranged at Addenbrooke's Hospital. Appointment for 6 or 12 months from 1st September.

Applications, stating age, qualifications and experience with dates, and copies of 3 testimonials, to Secretary, Addenbrooke's Hospital, Cambridge, by 25th August, 1956.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Resident ANÆSTHETIC SENIOR HOUSE OFFICER required late September for 1 year. Anæsthetic experience essential.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to Secretary by 29th August.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House OFFICER to Departments of Dermatology, Ophthalmology and Pædiatrics for 6 months from 11th October. Recognised Pre-registration Service (medical).

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to the Secretary by 1st September. Interviews early September.

CROMER AND DISTRICT HOSPITAL. Cromer Area HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR RESIDENT HOUSE OFFICER required at busy general hospital for the week commencing 10th September, 1956. Ideal surroundings on Norfolk coast. Locums rate of £14 10s. per week, less a deduction of £2 17s. 9d. for board and lodging, &c.

Applications, together with the names of 2 referees, should be forwarded to the Group Secretary of the Hospital Management Committee at Cliff-avenue, Cromer.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (casualty), Peterborough Memorial Hospital (150 Beds). 6 months of tenure recognised for F.R.C.S. Appointment for 1 year, renewable for second year.

Applications, stating age, experience, and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 27th August, 1956. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

DENBIGH (near). LLANGWYFAN HOSPITAL. (370 Beds. Pulmonary and non-pulmonary tuberculosis. Hospital contains a major Thoracic Surgery Unit, Genito-urinary Unit, Orthopædic Unit and Children's Unit.) SENIOR HOUSE OFFICER (Male or Female) required at the above Hospital.

Applications to be sent forthwith to Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. 2 RESIDENT HOUSE SURGEONS for above Hospital. Posts vacant 18th and 20th October, 1956. 6 months appointments. Posts recognised for F.R.C.S. and pre-registration purposes.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital by 1st September, 1956.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. (715 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. CASUALTY REGISTRAR (whole-time), required at above Hospital. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from, and returnable to, Group Secretary, Edgware General Hospital, by 28th August, 1956.

EDGWARE GENERAL HOSPITAL. (715 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (whole-time), resident, required in Department of Anæsthesia at above Hospital, vacant 8th September, 1956. Hospital may be visited by direct appointment with Medical Director.

Application forms obtainable from, and returnable to, Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 28th August, 1956.

ENFIELD. CHASE FARM HOSPITAL. Locum Senior HOUSE OFFICER required for casualty duties, 1st–14th October, 1956. Non-resident. Hours 9 A.M.–5.30 P.M. on Monday–Friday. 9 A.M.–1 P.M. Saturday.

Applications to Group Secretary, Enfield Group Hospital Management Committee.

EPPING. ST. MARGARET'S HOSPITAL. (480 Beds.) RESIDENT SENIOR HOUSE OFFICER (surgery), vacant 1st October, 1956. Post recognised for F.R.C.S. Busy general hospital with easy access to London. Salary on national scale, less deduction for board, lodging, &c.

Applications, with copies of 2 testimonials, to reach the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 31st August, 1956.

EPPING. ST. MARGARET'S HOSPITAL. (480 Beds.) HOUSE PHYSICIANS (2) as from 23rd September, 1956. The appointments, which are in general medicine, are for 6 months, including duties at Honey Lane Hospital for part of this time.

SENIOR HOUSE OFFICER (obstetrics), vacancy occurring 21st September, 1956. Post recognised for D.Obst.R.C.O.G. Salary on national scale, less deduction for board, lodging, &c. Busy general hospital with easy access to London.

Applications, with 2 recent testimonials, to the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex, by 23rd August, 1956.

EXETER (near). EXMINSTER HOSPITAL, Exminster, near EXETER. (1639 (mental) Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required. Previous psychiatric experience desirable but not essential if candidate has good general experience. Salary scale £775–£50–£1075. Accommodation is available for a single or married officer. Whitley Council terms and conditions of service.

Applications, giving age, nationality, qualifications and experience, with names of 2 referees, to the Group Secretary, Devon Mental Hospital Management Committee, Exminster Hospital, near Exeter, as soon as possible.

GLASGOW, N.1. STOBHILL GENERAL HOSPITAL. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the acute Geriatric Unit (70 Beds—for assessment and rehabilitation) supervised by a Consultant Physician specialising in geriatrics. The appointment offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses in the elderly and will be for 2 years in the first instance.

Applications, stating age, qualifications and experience, with the names of 2 referees, to be sent to the Medical Superintendent.

GRANTHAM AND KESTEVEN GENERAL HOSPITAL. Locum CASUALTY OFFICER required for 4 months commencing 1st September. Salary £14 10s. per week.

Applications to Secretary, 101, Manthorpe-road, Grantham.

GRIMSBY GENERAL HOSPITAL. Applications are invited for the post of HOUSE SURGEON (gynæcology) (pre-registration or Senior House Officer grade), with some relief obstetric duties. Senior House Officer post recognised for M.R.C.O.G. Up-to-date Medical Library and reading facilities available.

Apply, with 2 names for reference, to Hospital Secretary, Grimsby General Hospital, Grimsby, Lincs.

HEREFORD. COUNTY HOSPITAL. Senior House OFFICER (pædiatrics) required 5th October, 1956, at above Hospital for unit of 60 Beds.

Applications in writing, together with names of 2 referees, to Group Secretary, Victoria House, Eign-street, Hereford.

HASTINGS AND ST. LEONARDS. BUCHANAN HOSPITAL. (94 Beds.) HOUSE SURGEON in Gynæcology (28 gynæcological beds). Post, recognised for M.R.C.O.G., vacant 22nd September for 6 months. Candidates for Pre-registration Service (surgery) can be considered.

Apply, giving names of 3 referees, to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) HOUSE SURGEON (pre-registration post), vacant 25th September.

Apply to Hospital Administrator.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) SENIOR HOUSE OFFICER (casualty and orthopædic). Post vacant 20th August, 1956.

Apply to Hospital Administrator.

HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in the E.N.T. Department of the Victoria Hospital for Sick Children and the Hull Royal Infirmary. The post is recognised for the F.R.C.S. and D.L.O.

Applications, with testimonials, should be sent to the Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Locum CASUALTY OFFICER (Junior Hospital Medical Officer) required 20th August–1st September.

Applications, giving full details and 2 names for reference, should be sent to the Hospital Secretary at once.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) with attachment to Pædiatrician and Ophthalmic Consultant. Salary £745 p.a., less £150 p.a. residential emoluments. Recognised under F.R.C.S. regulations. Appointment to commence as soon as possible. Locum periods considered.

Apply, with full details and references, to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) Applications are invited for the post of CASUALTY OFFICER. The post, which is resident, is graded Junior Hospital Medical Officer and is recognised under the Fellowship regulations. Duties terminate at 7 P.M. daily with 1 night weekly on call.

Applications for the appointment, which will be vacant on 1st September, 1956, should be accompanied by copies of 3 recent testimonials and addressed to—

H. J. JOHNSON, Group Secretary.

The Royal Infirmary, Huddersfield.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical), now vacant. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

ILFORD. KING GEORGE HOSPITAL. Ilford and BARKING GROUP HOSPITAL MANAGEMENT COMMITTEE. There will be a vacancy for a SENIOR HOUSE OFFICER ANÆSTHETIST at the above Hospital on 1st October, 1956. The Officer appointed will be required to be available for duty in other hospitals in the Group. Salary will be at the rate of £745 p.a., less £150 p.a. emoluments.

Applicants should have been registered not less than 1 year, and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Group Secretary.

King George Hospital, Ilford.

ILFORD. KING GEORGE HOSPITAL. There is a vacancy for a CLINICAL ASSISTANT in the Psychiatric Department at above Hospital. 2 sessions per week (Tuesday). Applicant must be able to carry out psychotherapy treatment and must also have had experience in child guidance. Remuneration in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), i.e., £175 p.a. per weekly half-day.

Applications, accompanied by testimonials, to be sent to the undersigned within 7 days of the appearance of this advertisement. H. F. HARRIS, Group Secretary,

Ilford and Barking Group Hospital Management Committee.

King George Hospital, Ilford.

IPSWICH AND EAST SUFFOLK HOSPITAL. Heath ROAD WING, IPSWICH. (274 Beds.) Applications invited for the post of SENIOR HOUSE OFFICER (resident) to the Pædiatric Unit, vacant on 29th September. Recognised for D.C.H., and normally of 12 months tenure.

Detailed applications, with copies of 2 recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. Locum Tenens CASUALTY OFFICER (Senior House Officer grade) required from 17th to 31st October, 1956.

Applications with full particulars to Hospital Secretary.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified and experienced medical officers for the post of SENIOR HOUSE OFFICER (E.N.T.). The post, which is recognised for D.L.O. purposes, includes a small amount of relief duties in the Casualty Department and is available on 1st October, 1956. Resident or on a duty-room basis.

Applications, stating age, qualifications and experience, with 2 recent testimonials, should reach the Physician-Superintendent of the Hospital by 31st August.

KINGSTON HOSPITAL, Wolverton-avenue, Kingston UPON THAMES. KINGSTON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from suitably qualified and experienced medical officers for the post of SENIOR HOUSE OFFICER (orthopædic and casualty). The post, which is available on 1st October, 1956, is recognised in casualty for F.R.C.S. purposes.

Applications, stating age, qualifications and experience, with 2 testimonials, should reach the Physician-Superintendent of the Hospital by 31st August, 1956.

LANCASTER. BEAUMONT HOSPITAL, Slyne-road. PÆDIATRIC REGISTRAR (resident). Previous pædiatric experience essential. Duties include experience in children's medical ward, in Neonatal Unit, and pædiatric outpatient clinics. Unit recognised for D.C.H. Candidates may visit Hospital by direct appointment.

Applications, together with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

LANCASTER MOOR HOSPITAL, Lancaster. (Regional MENTAL HOSPITAL.) Applications invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident). Unfurnished flat available for married applicants; furnished quarters for single persons. Hospital recognised for D.P.M. and facilities granted for attending neighbouring universities. All modern methods of investigation and treatment (deep insulin, &c.) carried out; outpatient clinics; Hospital serving North Lancashire and Lake District. Post for initial period of 4 years, but renewable if services satisfactory.

Applications, giving names and addresses of 2 referees, to Medical Superintendent.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Chest Diseases

Leeds Chest Clinic and additional duties as required at Regional Sanatoria. Previous experience in diseases of the chest desirable. Accommodation for a single person only at Killingbeck Hospital.

Infectious Diseases

Castle Hill Hospital, Cottingham (167 I.D. beds). Resident.

General Medicine

(i) Wakefield A Group (80 general medical beds) with additional duties in the Wakefield B Group.

(ii) St. Luke's Hospital, Bradford (170 general medical beds). Non-resident.

Ophthalmology

St. James's Hospital, Leeds (22 eye beds—5600 new outpatients annually) and the Public Dispensary, Leeds. Non-resident.

Psychiatry

(i) Clifton Hospital, York (1100 Beds). Resident or non-resident.

(ii) Menston Hospital, near Leeds (2500 Beds). Resident.

(iii) Stanley Royd Hospital, Wakefield (1976 Beds).

If desired, facilities for attending Leeds University will be provided if the successful candidates are studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 24th August, 1956.

LEEDS REGIONAL HOSPITAL BOARD (in association with the Leeds Medical School) invites applications from fully Registered Practitioners for admission on 1st October, 1956, to the Regional Pathological Training Scheme. The scheme involves 4 years training—2 as Senior House Officer and 2 as Registrar and subject to satisfactory progress the appointments are renewed annually.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 24th August, 1956, from whom further details may be obtained on request.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited from registered medical practitioners (Male or Female) for the appointment of SENIOR HOUSE OFFICER or HOUSE SURGEON in Orthopædics (non-resident). The appointment to be graded according to the qualifications and experience of the applicant appointed. The Orthopædic Unit has 87 Beds, and facilities for postgraduate study are available.

Applications, on forms obtainable from the undersigned, to be returned completed not later than 24th August, 1956.

H. BLYTHE, Group Secretary.

MANCHESTER. BOOTH HALL (CHILDREN'S) HOSPITAL, BLACKLEY, MANCHESTER, 9. Locum RESIDENT MEDICAL OFFICER (Registrar grade) required from 24th September to 16th December during absence of Resident Medical Officer on P.-G. leave. Experience in pædiatrics essential.

Applications to Group Secretary at above address.

MANCHESTER. NORTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of REGISTRAR in Anæsthetics in the North Manchester Group and Booth Hall Hospital. Resident or non-resident. Recognised for D.A. and F.F.A.R.C.S.

Applications, with names of 2 referees, by 27th August, 1956, to Group Secretary, Crumpsall Hospital, Manchester, 8.

MANCHESTER REGIONAL HOSPITAL BOARD invites applications for post of RESIDENT SURGICAL REGISTRAR to Macclesfield District Group Hospitals, main duties Infirmary Branch Macclesfield Hospital. Hospital recognised for F.R.C.S. regulations.

Apply immediately, with names and addresses of 2 referees, to Group Secretary, "Willerby House," Cumberland-street, Macclesfield.

MANCHESTER REGIONAL HOSPITAL BOARD. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Registrar grade) at Salford Royal Hospital, vacant 11th October, 1956.

Applications, together with names and addresses of 2 referees, to be forwarded to the Group Secretary, Salford Royal Hospital, Salford, 3, before 1st September, 1956.

MANCHESTER REGIONAL HOSPITAL BOARD. Applications are invited for a resident post of SURGICAL REGISTRAR at the North Lonsdale Hospital, Barrow-in-Furness. Post recognised for F.R.C.S.

Applications to Group Secretary, Barrow and Furness Hospital Management Committee, 105, Abbey-road, Barrow-in-Furness.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of RESIDENT REGISTRAR in Obstetrics and Gynæcology, 1 of 2, in the West Manchester Group of hospitals with main duties at Park Hospital, Davyhulme. There are 73 obstetric beds, 31 gynæcology beds and a special care Baby Unit of 7 beds at Park Hospital. Vacant September. Appointment for 1 year, renewable.

Application forms from Group Secretary, Park Hospital, Davyhulme.

MANCHESTER REGIONAL HOSPITAL BOARD.
(*a*) SENIOR REGISTRAR in Anæsthetics with duties in the North Manchester Group of hospitals (mainly at Crumpsall Hospital) and at Booth Hall Hospital. F.F.A.R.C.S. desirable. Arrangements may later be made for the person appointed to transfer to the United Manchester Hospitals.
(*b*) SENIOR REGISTRAR in Pathology—joint post with United Manchester Hospitals. Facilities for training in all branches of pathology will be provided in both teaching and non-teaching hospitals in the Manchester area. Main duties initially at Manchester Royal Infirmary.
Application forms, obtainable from the Senior Administrative Medical Officer, Manchester Regional Hospital Board, Cheetwood-road, Manchester, 8, should be returned by 3rd September, 1956.

MANCHESTER. THE DUCHESS OF YORK HOSPITAL FOR BABIES AND WYTHENSHAWE HOSPITAL. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER, vacant 1st October. A joint post of not less than 3 months and preferably 6 months at each Hospital is recognised as training for the D.C.H. The Duchess of York Hospital is also attached to the Manchester University Department of Child Health.
Applications to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of the appearance of this advertisement.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for 4 posts of HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The posts are recognised for the purpose of the M.R.C.O.G. examination. The appointments are for 6 months starting 1st October, 1956. Salary in accordance with national scale.
Application forms may be obtained from the undersigned and returned not later than 24th August, 1956.
A. R. WISE, General Superintendent.
Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) 3 HOUSE OFFICERS (general surgery) required, pre-registration. Posts recognised for F.R.C.S. examination. Posts vacant mid-October, end October, mid-November respectively.
Application forms from Secretary.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE OFFICER required in the Group Laboratory. Post vacant 1st October, and renewable for 1 year. Duties, which alternate with holder of second similar post, include routine general pathology and emergency investigations. Laboratory recognised for D.Path. and D.C.P. examinations. Previous experience not essential.
Application forms from Group Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (obstetrics and gynæcology) becoming vacant on 1st September, 1956. The Hospital takes part in undergraduate medical teaching and the post is recognised in obstetrics and gynæcology for M.R.C.O.G. purposes.
An application form should be obtained from the Group Secretary at the Hospital and returned within 14 days of the appearance of this advertisement.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANCHESTER COMMITTEE. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade), vacant immediately. Previous experience in pathology not essential, the post affording opportunities for gaining experience in all branches of clinical pathology.
Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of the appearance of this advertisement.

MANCHESTER, 23. WYTHENSHAWE HOSPITAL. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (E.N.T.) for the above-named Hospital. The post is recognised by the Royal College of Surgeons of England.
Applications, stating age, qualifications, present post, experience, and names of 2 referees, should reach the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of the appearance of this advertisement.

MANCHESTER. MONSALL HOSPITAL, Newton Heath, MANCHESTER, 10. SENIOR HOUSE OFFICER required (resident) for infectious diseases wards. The Hospital is a Regional Centre for Poliomyelitis.
Applications, with names of 2 referees, to Deputy Group Secretary, Monsall Hospital, from whom further particulars may be obtained.

MORPETH, NORTHUMBERLAND. NORTHGATE AND DISTRICT HOSPITAL. JUNIOR HOSPITAL MEDICAL OFFICER required. The Hospital consists of 4 units with a total of 638 Beds for mental defectives of all ages and grades. A modern flat (furnished or unfurnished) is available. Salary and conditions in accordance with national scale. Facilities for study.
Applications, stating age, qualifications, experience and names of 2 referees, to the Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post, now vacant, of SENIOR HOUSE OFFICER, for orthopædic and casualty duties. The post is resident.
Applications, giving age, nationality and qualifications, together with 3 recent testimonials, should be sent to the Medical Superintendent.

MARGATE. ROYAL SEA BATHING HOSPITAL. (Surgical Tuberculosis and Orthopædics—241 Beds.) SENIOR HOUSE OFFICER. This post (1 of 2) is largely an orthopædic one, and affords experience in the treatment of tuberculous and non-tuberculous orthopædic conditions. There is also a Genito-urinary Unit of 35 Beds and a small number of beds for other tuberculous conditions. The post is recognised for the F.R.C.S., and is suitable for someone reading for a higher surgical examination. Salary £745 p.a., less £150 for residential emoluments.
Applications, with copies of testimonials, to Hospital Secretary.

NEWCASTLE GENERAL HOSPITAL. (844 Beds.) SENIOR HOUSE OFFICER (general surgery), resident post, vacant 1st October, 1956. Recognised for F.R.C.S.
Applications, together with names and addresses of 2 referees, should be sent to the Secretary, Newcastle upon Tyne Hospital Management Committee, Newcastle General Hospital, Newcastle upon Tyne, 4.

NEWCASTLE REGIONAL HOSPITAL BOARD. Cleve-LAND HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR PÆDIATRICIAN (whole-time). Children's Hospital, Stockton-on-Tees (84 Beds). Well-furnished married accommodation available.
Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Darling-TON HOSPITAL MANAGEMENT COMMITTEE. REGISTRAR ORTHOPÆDIC SURGEON (whole-time), resident or non-resident. Single accommodation available. Appointment to commence 1st December, 1956.
Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Walker Gate Hospital, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR REGISTRAR in Radiology. Applicants should have spent at least 2 years as Registrar in Diagnostic Radiology and should be in possession of the D.M.R. (Diagnostic). The appointment will be for 1 year in the first instance and will be subject to terms and conditions of service of hospital medical staff in the National Health Service.
Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.
A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for 2 non-resident whole-time appointments of SENIOR HOUSE OFFICER in a General Medical Clinic at the Royal Victoria Infirmary. The appointments are for 1 year and will be subject to the terms and conditions of service of hospital medical staff in the National Health Service. The salary will be at the rate of £745 p.a., subject to the appropriate deductions.
Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.
A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of SENIOR HOUSE OFFICER to the Department of Psychological Medicine at the Royal Victoria Infirmary. The successful candidate will have opportunity for clinical experience in inpatient and outpatient work under the direction of the Professor in Psychological Medicine at the University of Durham and he will also be responsible for emergency duty as required. A new 54-Bedded Research and Clinical Unit will be opened in the near future at Newcastle General Hospital at which he will also have an opportunity to gain experience. The appointment is for 1 year and will be subject to the terms and conditions of service of hospital medical staff.
Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.
A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NORTHAMPTON (near). CREATON SANATORIUM. Applications are invited from suitably qualified medical practitioners for the post of SENIOR HOUSE OFFICER. The Sanatorium has 138 Beds and is for the treatment of both pulmonary and non-pulmonary tuberculosis. There is a new major Thoracic Surgical Unit for tuberculous and non-tuberculous diseases of the chest.
Applications, stating age, experience and qualifications, together with the names and addresses of 2 referees, should be sent to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton.

NORTHAMPTON (near). CREATON SANATORIUM. Applications are invited for the post of HOUSE OFFICER, which is recognised as a pre-registration medical appointment. The Sanatorium has 138 Beds and is for the treatment of both pulmonary and non-pulmonary tuberculosis. There is a new major Thoracic Surgical Unit for tuberculous and non-tuberculous diseases of the chest.
Applications, stating age, experience and qualifications, together with the names and addresses of 2 referees, should be sent to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton.

NOTTINGHAM GENERAL HOSPITAL. Senior House OFFICER (anæsthetics) required as soon as possible. The post is recognised for the D.A., and the F.F.A.R.C.S. This is a busy general hospital giving experience in all branches of surgery.
Applications, stating age, nationality, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM. HIGHBURY HOSPITAL. Senior HOUSE OFFICER (surgical) required at the above Hospital. Good opportunity for obtaining experience in all types of general surgery. Duties to commence on or about 16th September, 1956.

Applications, stating age, qualifications and experience, and nationality, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE OFFICER (obstetrics and gynæcology; recognised for pre-registration purposes), which will be graded Senior House Officer or House Officer in accordance with experience. Recognised for the M.R.C.O.G. and D.Obst.R.C.O.G. Post vacant on 6th October, 1956.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

ORPINGTON HOSPITAL, Orpington, Kent. Resident SENIOR HOUSE OFFICER ANÆSTHETIST required immediately for above 813-bedded General Hospital. Male or Female. Recognised for D.A.

Applications, with copies of 2 recent testimonials, to Physician-Superintendent.

OSWESTRY. THE ROBERT JONES AND AGNES HUNT ORTHOPÆDIC HOSPITAL. SENIOR HOUSE OFFICER (2 vacancies), one immediately, one 9th September. Resident.

Apply Secretary.

OXFORD. UNITED OXFORD HOSPITALS. Applications invited for the post of HOUSE OFFICER in the Oxford Eye Hospital, with effect from 1st October, 1956.

Applications, stating age, qualifications, and experience, together with names of 2 referees, to the Administrator, Radcliffe Infirmary, Oxford, by 24th August, 1956.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Queen Alexandra Hospital

(*a*) SENIOR HOUSE OFFICER for Gynæcological Department (39 Beds), vacant now. Recognised for M.R.C.O.G.

(*b*) SENIOR HOUSE SURGEON (87 surgical beds), vacant 1st September, 1956.

Royal Portsmouth Hospital

(*a*) HOUSE OFFICER (pre-registration), Orthopædic Department (104 Beds), vacant now.

(*b*) HOUSE PHYSICIAN (pre-registration) (65 medical beds), vacant 17th August.

(*c*) SENIOR HOUSE SURGEON (70 surgical beds), vacant 19th September, 1956.

Saint Mary's Hospital

(*a*) HOUSE PHYSICIAN (pædiatric), vacant 15th August. Pædiatric Unit of 53 Beds, the post is recognised for candidates preparing for the D.C.H.

(*b*) HOUSE PHYSICIAN (pre-registration) (74 medical beds), vacant 13th August.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

35, Grove-road South, Southsea.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (622 Beds.) HOUSE OFFICER (obstetrics) required. Post vacant 20th September, 1956. Recognised for D.Obst.R.C.O.G. The Hospital has 75 maternity beds, a gynæcological ward of 25 beds and a Premature Baby Unit of 8 cots.

Applications, stating age, &c., to the Secretary at the above Hospital by 31st August, 1956. J. C. FIELD, Secretary.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT HOUSE SURGEON required from 29th September, 1956, in the General Surgical Unit at the above Hospital. Recognised for F.R.C.S. This very active General Surgical Unit of a total of 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidate appointed will be attached to a unit of approximately 60 Beds.

Applications should be forwarded immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER required in the Department of Ophthalmology from 8th September, 1956.

Applications should be addressed immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male) required early in September, 1956. Post not approved for pre-registration purposes.

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for 2 posts of RESIDENT JUNIOR HOUSE SURGEON in the Area Accident and Orthopædic Department. 1 vacant immediately the other 1st October next. F.R.C.S. recognised. Also casualty duties. Salary £425–£525 p.a., less £125 board-residence.

Apply, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Hospital Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (399 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered and provisionally registered medical practitioners for the resident post of HOUSE PHYSICIAN in the Pædiatric Department; vacant 15th September for 6 months.

Write, before 3rd September, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Secretary.

READING. ROYAL BERKSHIRE HOSPITAL. (399 Beds.) Applications are invited from provisionally registered medical practitioners, Male and Female, for resident post of HOUSE SURGEON, vacant 21st August, 1956, and tenable for 6 months.

Write immediately, stating age, qualifications with dates, nationality, present post with copy of 1 recent testimonial, to the Secretary.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER in the Area Department of Diseases of the Chest, for duty in the Reading Chest Clinic. The post offers wide experience in both tuberculous and non-tuberculous chest diseases and duties will include attendance at Prospect Park Hospital, Reading, and Peppard Chest Hospital, Henley. Facilities are available for postgraduate studies. Salary within the scale £775–£1075 p.a.

Applications, stating age and qualifications, together with names of 3 referees, should be sent to the Group Secretary, 3, Craven-road, Reading.

REDHILL COUNTY HOSPITAL, Earlswood Common, REDHILL, SURREY. Locum REGISTRAR (obstetrics and gynæcology), required 1st–15th September, 1956. Resident appointment.

Apply to Secretary, Redhill Group Hospital Management Committee, Earlswood Mount, Pendleton-road, Redhill (Redhill 3581—Ext. 20).

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (recognised by R.C.O.G.) to run consecutively in this order from 2nd November, 1956, for a period of 6 months in each post. The posts are open to pre-registration candidates.

Apply, enclosing 2 recent references, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Orthopædic Depart-MENT. Applications are invited for the post of SENIOR HOUSE OFFICER (resident) or RESIDENT HOUSE SURGEON which is also recognised for pre-registration candidates. The Department has over 50 Beds and a large outpatient turnover, dealing with fractures and all types of orthopædic surgery.

Applications, stating age, nationality, qualifications and experience, and naming 2 referees, to the Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury, as soon as possible.

SALISBURY. ODSTOCK HOSPITAL. South West METROPOLITAN REGIONAL HOSPITAL BOARD. SALISBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT MEDICAL OFFICER/PÆDIATRIC REGISTRAR at above Hospital for a period of 12 months in the first instance from 17th October, 1956.

Application forms may be obtained from, and must be returned to, the Group Secretary, Odstock Hospital, Salisbury, by 1st September, 1956.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Geriatrics. DUNDEE AND ANGUS AREA. Applications are invited for the post of SENIOR REGISTRAR for the Geriatric Service in the Dundee and Angus Area which is based on Maryfield (General Teaching) Hospital, Dundee, and Stracathro (General) Hospital, near Brechin. The Senior Registrar will have his main responsibilities at Stracathro Hospital. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 8th September, 1956.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. Applications are invited for the appointment of REGISTRAR in Radiodiagnosis at the Edinburgh Northern Group of hospitals vacant on 1st October, 1956. The work will be mainly at the Western General Hospital.

Applications, giving particulars of age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, by 8th September, 1956.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance:—

SENIOR REGISTRAR in Medicine based at the Royal Infirmary, Glasgow.
SENIOR REGISTRAR in Pathology based at the Victoria Infirmary, Glasgow.
SENIOR REGISTRAR in Surgery based at Stobhill General Hospital, Glasgow.
SENIOR REGISTRAR in Surgery based in the first instance at Stirling Royal Infirmary.
REGISTRAR in Ophthalmology based at the Western Infirmary, Glasgow.
REGISTRAR in Radiodiagnosis based at the Victoria Infirmary, Glasgow.
REGISTRAR in Surgery based at the Western Infirmary, Glasgow.

These appointments are subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 1st September, 1956.

SLEAFORD, LINCOLNSHIRE. RAUCEBY HOSPITAL. RESIDENT LOCUM TENENS (Junior Hospital Medical Officer grade) required immediately for above Mental Hospital. £17 10s. per week, less £3 for board, residence and laundry. This Hospital provides experience in all branches of psychiatry.

Applications to be sent to the Group Secretary, Harmston Hall, Lincoln.

SCUNTHORPE. WAR MEMORIAL HOSPITAL. (262 Beds.) Applications are invited for RESIDENT HOUSE PHYSICIANS.

(*a*) Senior House Officer/Intern, vacant late September.

(*b*) Intern/Senior House Officer, vacant early October.

Busy department with medicine, pædiatrics, skins and eyes—large outpatient clinics.

Applications, naming 2 referees, to Group Secretary, Scunthorpe Hospital Management Committee.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the resident appointment of HOUSE SURGEON (general surgery). Recognised pre-registration post. Vacant 29th October, 1956.

Apply, giving full details of age, nationality, qualifications, present and previous appointments if any, and the names of 2 persons for reference, to the Group Secretary at Nether Edge Hospital, Sheffield, 11.

SHEFFIELD. CITY GENERAL HOSPITAL. (652 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT MEDICAL REGISTRAR required with duties also at Fir Vale Infirmary. General medical experience would be gained at the City General Hospital and geriatric experience at Fir Vale Infirmary. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 27th August, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. CITY GENERAL HOSPITAL. (652 Beds. Recognised for training for the F.R.C.S. examination.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time NON-RESIDENT REGISTRAR (orthopædics) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 27th August, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD. LODGE MOOR HOSPITAL. (496 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (infectious diseases) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 27th August, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SHEFFIELD REGIONAL HOSPITAL BOARD and BOARD OF GOVERNORS OF THE UNITED SHEFFIELD HOSPITALS. Reciprocal Training Scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in Anæsthetics required. Initial tenure at City General Hospital, Sheffield (692 Beds), a large general hospital having teaching affiliations with the University of Sheffield and with Professorial Medical and Gynæcological Units, a Department of Thoracic Surgery and a Regional Cardiological Centre. Appointment for 1 year in first instance and renewable thereafter annually. Incumbent will be transferred to the Teaching Hospitals for the second phase of the appointment in accordance with arrangements under the Reciprocal Training Scheme. Renewal of appointment and transfer to the Teaching Hospitals will be subject to satisfactory work and progress.

Further details and form of application from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Forms to be returned by 3rd September, 1956.

SHREWSBURY. CHILDREN'S UNIT, ROYAL SALOP INFIRMARY. Locum SENIOR HOUSE OFFICER (pædiatric), for 1st–15th September, 1956. The Unit consists of medical, surgical and fever beds.

Apply in writing giving full details to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SKIPTON (near). GRASSINGTON HOSPITAL. (208 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required for the above Hospital, which provides treatment for tuberculosis patients, men and women. Accommodation available for single applicants. Post tenable from 1st September, 1956, or earlier if desired.

Applications to Medical Superintendent.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. CASUALTY HOUSE OFFICER required, 1 of 2, for busy Casualty Department. Experience provided in orthopædic and plastic cases. Salary on House Officer scale plus £50 p.a.

Applications, together with names of 2 referees, to Secretary.

SOUTHPORT GENERAL INFIRMARY. Junior Hos-PITAL MEDICAL OFFICER (resident). Whole-time casualty post.

Apply, stating age, nationality, qualifications, experience and copies of 2 recent testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds.) RESIDENT HOUSE PHYSICIAN required mid-September. Pre-registration candidates eligible.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) ORTHOPÆDIC HOUSE SURGEON required. Post recognised for Pre-registration Service and tenable for 6 months. The Hospital is the centre to which all trauma from a large industrial town and port is directed thus providing excellent experience in the treatment of traumatic conditions; patients with orthopædic conditions are also drawn from a wide area.

Applications, with copies of testimonials, should be sent as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTH EAST METROPOLITAN REGIONAL HOS-PITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Anæsthetics to fill a vacancy in the approved trainee establishment at the Orpington and Sevenoaks Group of hospitals, available on 1st November, 1956. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 1st September, 1956.

SOUTH CHESHIRE HOSPITAL MANAGEMENT COMMITTEE.

SENIOR HOUSE OFFICER (anæsthetics). 6 months or 12 months as preferred. Approved for D.A. Duties chiefly at general hospital and maternity unit. Salary and conditions as per regulations.

Applications, stating age, details of experience, qualifications and names of 3 referees, immediately, to Group Secretary, Group Headquarters, Barony Hospital, Nantwich, Cheshire.

ANÆSTHETIST (Locum), month of September. 2 weeks 9 sessions, 2 weeks 8 sessions. Registrar grading.

Applications with full details, immediately, to Group Secretary, Group Headquarters, Barony Hospital, Nantwich, Cheshire.

SOUTH CHESHIRE HOSPITAL MANAGEMENT COM-MITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (anæsthetics), 3 years appointment; D.A. preferred. New operating suite to be opened shortly. Duties chiefly at general hospital and a Maternity Unit at another hospital. Hospital approved for D.A. Salary and conditions as per regulations.

Applications, giving age, details of experience, and names of 3 referees, immediately, to Group Secretary, Group Headquarters, Barony Hospital, Nantwich.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Applications are invited for appointment as RESIDENT ANÆSTHETIST (Senior House Officer grade). Post vacant 1st October, 1956. The appointment is recognised as fulfilling the conditions of the F.F.A.R.C.S. and the D.A.

Applications, stating age, experience and qualifications, with copies of 2 testimonials, should be sent to the undersigned not later than 24th August, 1956. J. C. FIELD, Secretary.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Applications are invited for the post of SECOND CASUALTY OFFICER (Senior House Officer grade) with duties in the Fracture and Orthopædic Department. Resident. Post vacant 2nd September, 1956. The post is recognised for F.R.C.S.

Applications, stating age, qualifications and experience, with copies of recent testimonials, to reach the undersigned by 23rd August, 1956. J. C. FIELD, Secretary.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Locum E.N.T. REGISTRAR required for the period 10th–22nd September, 1956, inclusive. Accommodation can be provided if required.

Applications, stating age, experience and qualifications, should be sent to the undersigned as soon as possible.

J. C. FIELD, Secretary.

ST. HELENS HOSPITAL. (196 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON, which is recognised for Pre-registration Service.

Applications, stating age, date of qualification and experience, and giving 2 names for reference, should be forwarded to—

N. RICHARDS, Group Secretary,
St. Helens and District Hospital Management Committee,
Whiston Hospital, Prescot.

STOCKPORT INFIRMARY. (163 Beds.) Stockport and BUXTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (general surgery and ophthalmology), vacant 24th September, 1956. This post is approved for pre-registration purposes and recognised for the F.R.C.S. and D.O.M.S.

Applications, stating age, qualifications and experience, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (pædiatrics) required, vacant very shortly. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. HOUSE OFFICER (obstetrics and gynæcology) required, vacant 3rd September. Pre-registration post. Recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

Applications to Hospital Management Committee Secretary, Princes-road, Stoke-on-Trent, as soon as possible.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) SENIOR HOUSE OFFICER (ophthalmology) required. Recognised F.R.C.S. and D.O.

Applications to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertford-SHIRE. (384 Beds). Locum Tenens CASUALTY OFFICER required for the period 1st–16th September, inclusive.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

TORQUAY. TORBAY HOSPITAL. Resident Senior HOUSE OFFICER (surgery) required early September, 1956. Post recognised for F.R.C.S. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, age, nationality, with copies of testimonials (quoting Ref. F. 955/72) to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

SIDCUP AND SWANLEY HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (casualty and orthopædic) required from mid-September, 1956. The successful applicant will serve 3 months as Casualty Officer and 3 months in the Orthopædic Department. The post is recognised under the Fellowship regulations as a period of 6 months casualty training.

Applications, stating age, qualifications, and experience, together with names and addresses of 2 referees, should be sent to Secretary, Queen Mary's Hospital, Sidcup, Kent.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. RESIDENT ANÆSTHETIC REGISTRAR required at above Hospital. Post recognised for F.F.A.R.C.S.

Application forms obtainable from, and returnable to, Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 24th August.

WAKEFIELD. THE GENERAL HOSPITAL, Park Lodge-lane, WAKEFIELD. (158 Beds.) RESIDENT SURGICAL OFFICER (Senior House Officer grade) required at the above Hospital. Post vacant immediately. Salary and conditions of service in accordance with national recommendations.

Application should be made to the Group Secretary, Hospital Management Committee No. 9 Wakefield A Group, 113, Northgate, Wakefield.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) SENIOR HOUSE OFFICER (casualty) required for part-time duties in modern department to assist 2 full-time Casualty Officers. Times of duty can be adjusted to suit applicant and amount to approximately 26 hours per week.

Applications, with names of 2 referees, to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) SENIOR HOUSE OFFICER (casualty) required for full-time duties in modern department. 2 other Casualty Officers employed. Post recognised for F.R.C.S., vacant 20th August.

Applications, with names of 2 referees, to the Administrator.

WATFORD. SHRODELLS HOSPITAL. (General Hos-pital—420 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Geriatric Unit. This unit of 180 Beds under full-time Geriatrician, offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses in the elderly. Full laboratory and radiological facilities available. Adequate time for reading.

Applications, together with copies of not more than 2 testimonials, to reach the Medical Officer-in-charge as soon as possible.

WARRINGTON GENERAL HOSPITAL. (344 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female), graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £745 p.a., less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— H. L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee.

c/o General Hospital, Warrington, Lancs.

WELSH REGIONAL HOSPITAL BOARD.

PÆDIATRIC REGISTRAR, Maelor General Hospital, Wrexham (591 Beds). Unit consists of 50 general pædiatric beds, also care of neonates. Recognised for D.C.H. Resident.

REGISTRAR in Thoracic Surgery. Based at Morriston Hospital, Morriston, near Swansea, also expected serve other hospitals in district. Unit has 60 Beds for all types thoracic surgery, including tuberculous, non-tuberculous, œsophageal and cardiac. Resident/non-resident.

REGISTRAR (general surgery), Pembroke County War Memorial Hospital, Haverfordwest. Resident or non-resident.

REGISTRAR (general surgery), Neath General Hospital. Resident/non-resident. Hospital recognised for F.R.C.S.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WESTON-SUPER-MARE GENERAL HOSPITAL. Resi-dent Locum Tenens CASUALTY OFFICER (Senior House Officer grade) required at the above Hospital for the period 1st–14th October, 1956, inclusive.

Applications should be addressed to the Group Secretary, Weston-super-Mare Hospital Management Committee, c/o The Convalescent Hospital, Uphill-road, Weston-super-Mare.

WINDYGATES, FIFESHIRE. CAMERON I.D. HOS-PITAL. 2 RESIDENT HOUSE PHYSICIANS required as at 1st October, 1956, 1 for duty in the infectious diseases wards (100 Beds) and 1 for duty for the remaining beds, 30 aged sick and 30 tuberculosis. Both posts qualify for pre-registration. Salary in accordance with national scale.

Apply, with copies of 2 recent testimonials, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

WOLVERHAMPTON GROUP.

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)

SENIOR HOUSE OFFICER or HOUSE OFFICER required (E.N.T. Department), vacant now. Recognised for the D.L.O. and F.R.C.S. examination. Also listed as a pre-registration post.

Apply Secretary, with copies of testimonials.

WORKSOP. KILTON HOSPITAL. (190 Beds.) Sheffield REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics and gynæcology) required with duties also at Victoria Hospital, Worksop (127 Beds). Appointee to commence as near 1st October as possible. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-Road, Sheffield, by 27th August, 1956, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

Public Appointments

DUBLIN. LOCAL APPOINTMENTS COMMISSION. Position vacant. Leitrim County MEDICAL OFFICER. Salary scale £1623–£1847.

Application forms and particulars from the Secretary, Local Appointments Commission, 45, Upper O'Connell-street, Dublin. Latest time for receiving completed application forms 5 P.M. on 4th September, 1956.

GOVERNMENT OF BRITISH GUIANA. Medical OFFICERS required for general duties. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service ; or on contract for 3 years resident service with gratuity (taxable) of 22½% of salary for each 3 months service. Candidates in the National Health Service may leave but retain their superannuation rights during service abroad (up to 6 years) and receive gratuity (taxable) of 20% of aggregate salary on leaving oversea service. Salary scale £950–£1450 a year. Starting salary according to qualifications and experience. Income-tax at local rates. Free unfurnished quarters or allowance in lieu when attached to Institutions, or at rental of 10% of salary in districts where quarters are available. Generous home leave. Free passages on appointment for Officer, wife, and children under 18 not exceeding 5 persons in all. Assisted passages on leave for Officer and wife. Candidates must have qualifications registrable in the United Kingdom.

Application forms from the Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/30/01).

GOVERNMENT OF BRITISH GUIANA. Obstetrician required for the Public Hospital, Georgetown, to be responsible for obstetrical wards and ante-natal clinics, and for a number of beds for gynæcological patients. He will be required to instruct junior Medical Officers and Nurses in Obstetrics, and perform such other duties as may be assigned by the Director of Medical Services. Appointment on permanent basis with pension (non-contributory) 1/600th of final pensionable emoluments for each completed month of service ; or on contract for 3 years resident service with gratuity (taxable) of 22½% of salary for each 3 months service. Candidates in the National Health Service may leave but retain their superannuation rights during their service abroad (up to 6 years) and receive a gratuity (taxable) of 20% of the aggregate of their salary on leaving overseas employment. Salary £1800 a year, plus non-pensionable allowance of £250 a year in lieu of consultation fees. Private practice not permitted. Free unfurnished quarters provided if available or an allowance of £100 a year in lieu. Generous home leave. Free passages on appointment for Officer, wife, and children under 18 years not exceeding 5 persons in all. Assisted passages for Officer and wife on leave. Candidates must hold medical qualifications registrable in the United Kingdom and M.R.C.O.G.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/30/021).

GOVERNMENT OF THE EASTERN REGION OF NIGERIA. SPECIALIST (orthopædic surgeon) required in Leprosy Service of the Eastern Region of Nigeria to undertake orthopædic and plastic surgery at leprosy settlements, each of which has a small hospital of 60–100 Beds with operating theatre and laboratory, and to demonstrate to medical officers modern methods in plastic surgery in maimed and deformed leprosy patients. Appointment on contract for 1 year in first instance with possibility of further 1-year tour thereafter. Salary £2442 a year and a gratuity (taxable) on completion of satisfactory engagement at the rate of £37 10s. for each completed period of 3 months service (including leave). Quarters provided at low rental. Taxes at local rates. Annual local leave permissible ; generous home leave granted after each tour. Free return passages for Officer and wife ; and, when appropriate either (but not both) of the following in any 1 tour of service :—

(*a*) 1 return sea passage for each of 2 children under age of 18 subject to maximum of £75 in respect of the return journey for each child ; or

(*b*) An allowance of £75 a year for each of 2 children under age of 18 maintained outside Nigeria for whole of tour.

Candidates must be Fellows of a Royal College of Surgeons or have higher degree in orthopædics and experience in orthopædic and plastic surgery.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/411/04).

GOVERNMENT OF NORTHERN RHODESIA. Medical OFFICER required for Silicosis Medical Bureau of the Health Department. Duties include clinical and radiological examination of miners (European and African). Officer will be stationed at Kitwe and will work under supervision of Chairman (a Medical Specialist) of the Silicosis Medical Bureau. Kitwe is a town of considerable size with agreeable climate and many social amenities. Post offers excellent opportunity for experience in diseases of chest and research in pneumoconiosis. Appointment can be on permanent basis with pension, or short-term contract with gratuity (taxable). Candidates in National Health Service may leave National Health Service but retain their superannuation rights (up to 6 years) and receive a gratuity (taxable) of 20% of aggregate of salary at end of engagement. Salary scale from £1245 to £2030 a year, starting salary depending upon age and experience. Pension for permanent appointment at rate of 1/600th of final pensionable emoluments for each completed month of service. Gratuity for contract appointment is £37 10s. for each completed 3 months of service. Free passages are provided in both directions for Officer and wife, and assisted passages for children. Housing is available and married candidate may be accompanied by family. Candidates (male only) should be between 25 and 35 years of age, possess medical qualifications registrable in the United Kingdom and have had at least 12 months postgraduate experience.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/3/02).

LONDON COUNTY COUNCIL. Audiologist required for sessional employment at various school treatment centres for the examination of deaf or partially deaf children.

Applications invited from medical practitioners of Consultant status. Fee 4 guineas a session of 1½—2½ hours.

Apply for details and application form to the Medical Officer of Health (PH/D.I/1498), The County Hall, Westminster Bridge, S.E.1.

BIRMINGHAM. CITY OF BIRMINGHAM. Public HEALTH DEPARTMENT. Applications invited from registered medical practitioners for post of ASSISTANT ADMINISTRATIVE MEDICAL OFFICER OF HEALTH (Male or Female). Candidates should hold the Diploma of Public Health. The successful candidate will have an opportunity to gain administrative experience in all branches of the Public Health Service, including maternity and child welfare. Salary scale £1405–£55–£1625 p.a. Commencing salary within the scale will depend upon the medical officer's experience. Pension scheme (including Widows and Orphans); medical examination. The successful applicant will be expected to take up duty in about 3 months time. The officer appointed will be required to devote his/her whole-time to official duties and the appointment will be subject to 3 months notice on either side.

Applications, with the names of 3 persons to whom reference may be made, to be sent to the Medical Officer of Health, Council House, Birmingham, 3, not later than 27th August, 1956.

GOLD COAST LOCAL CIVIL SERVICE. Ministry of HEALTH. SPECIALIST PHYSICIAN required to take charge of special medical wards in large hospital and to give opinion on cases referred by medical officers and private practitioners. Candidates should hold Membership of 1 of Royal Colleges of Physicians and have had 4 years full-time experience in work of this specialty. Appointment would be to Gold Coast Civil Service on contract for 2 tours of duty of from 18 to 24 months each in the first instance with gratuity on satisfactory completion of service. Basic salary scale would be £2400–£2700 a year. Gratuity (taxable) of £12 10s. for each completed month of service. Candidate in National Health Service may leave National Health Service but retain superannuation rights (up to a maximum stay of 6 years). Salary in this case would be in the scale £1900–£2200 a year, and gratuity 20% of aggregate of salary. Temporary addition of £29 15s. a year also payable. Starting point in both salary scales determined according to qualifications and experience. Quarters when available at rental not exceeding £150; income-tax at local rates; free passages for Officer, wife, and up to 3 children under 13 years of age. Generous home leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/13/017).

GOLD COAST LOCAL CIVIL SERVICE. Applications are invited for the following posts in the Ministry of Health, Gold Coast.

RADIOLOGIST to take charge of Hospital X-ray Departments and train junior staff as X-ray attendants. Candidates must possess D.M.R.D.

PATHOLOGIST to carry out routine duties of Clinical Pathologists including haematology, bacteriology, histopathology and biochemistry. May be required to perform post-mortem examinations and other duties in connection with forensic medicine. Candidates must have had at least 2 years full-time approved laboratory experience.

Appointment is to Gold Coast Local Civil Service and may be:

(*a*) Contract for 2 tours of duty of 18–24 months with gratuity (taxable) of £12 10s. for each completed month of service.

(*b*) 3 years probation for permanent and pensionable employment. Pension (non-contributory) at rate of 1/600th of final pensionable emoluments for each completed month of service; or

(*c*) Doctors in the National Health Service may leave the National Health Service but retain their superannuation rights while in the Gold Coast (up to 6 years) and receive a gratuity (taxable) of 20% of their Gold Coast salary.

Salary under (*a*) from £1330 to £2310 a year and under (*b*) and (*c*) £1055 to £1850 a year, starting point being determined by qualifications and experience. Temporary addition of £29 15s. a year also payable. Quarters at rental not exceeding £150 a year. Income-tax at local rates. Free passages for Officer, wife, and up to 3 children under 13 years of age. Annual local leave permissible and generous home leave granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/13/010).

GOLD COAST LOCAL CIVIL SERVICE. Gold Coast MEDICAL SERVICE. Applications are invited from doctors for the following posts in the Gold Coast Local Civil Service:—

(1) MEDICAL OFFICERS for general duties including hospital and district work.

(2) MEDICAL OFFICERS OF HEALTH. Diploma of Public Health or a similar recognised qualification required.

Appointment may be as follows:—

(*a*) Contract for 2 tours of duty of 18–24 months with gratuity (taxable) at the rate of £12 10s. for each completed month of service.

(*b*) On 3 years probation for permanent and pensionable employment. Pension (non-contributory) is earned at the rate of 1/600th of the final pensionable emoluments for each completed month of service.

(*c*) Doctors in the National Health Service may leave the National Health Service but retain their superannuation rights while in the Gold Coast (up to 6 years) and receive a gratuity (taxable) of 20% of their Gold Coast salary.

Salaries for officers appointed under (*a*) range from £1330 to £2310 a year and under (*b*) and (*c*) £1055 to £1850 a year, starting point being determined by qualifications and experience.

Quarters at rental not exceeding £150 a year. Income-tax at local rates. Free passages for Officer, wife, and up to 3 children under 13 years of age. Annual local leave is permissible and generous home leave is granted after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/13/04).

GOLD COAST. Medical Officer required at West African Cocoa Research Institute to take medical care of large cocoa research station, and supervise general sanitation and health measures in station. Well-equipped dispensary provided but no hospital accommodation. Experience in general and tropical medicine also public health required. Appointment on contract for 2 tours of duty of from 18 to 24 months each in first instance with gratuity on satisfactory completion of service. Basic salary scale £1330–£2310 a year. Gratuity (taxable) payable at rate of £12 10s. for each completed month of service. Candidate in the National Health Service may leave the National Health Service but retain his superannuation rights (up to a maximum stay of 6 years). Salary in this case would be in the scale £1055–£1850 a year, and gratuity 20% of aggregate of salary. Temporary addition of £29 15s. a year also payable. Starting-point in both salary scales is determined according to qualifications and experience. Quarters at low rental; income-tax at local rates; free passages for Officer, wife, and up to 3 children under 13 years of age. Generous home leave.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.197/200/015).

HER MAJESTY'S OVERSEA SERVICE. Medical Branch —TANGANYIKA. MEDICAL OFFICERS with qualifications registrable in United Kingdom required for general duties. Officers would normally be based on a hospital but must be prepared to tour and to assist in training African staff. Appointments can be made on permanent basis with pension (non-contributory), or on short-term contract with gratuity payable on satisfactory completion of service. A doctor in National Health Service may leave the National Health Service but retain his superannuation rights (up to limit of 6 years) and receive a gratuity (taxable) of 20% of his aggregate salary after engagement. Salary ranges from £1284 to £2115 a year, starting point determined by experience. 4 extra increments given to successful candidates possessing the F.R.C.S., M.R.C.P., D.P.H., or other approved higher qualifications. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in Tanganyika and other territories in medical administration or, if they possess higher qualification and suitable experience, in specialist posts. Quarters are generally available at rental varying from £30 to £78 a year according to size and type, and furniture at rate varying from £12 to £24 a year. Free passages in both directions for Officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave granted after each tour of from 30 to 36 months. Educational facilities available.

Application forms from Director of Recruitment, Colonial Office, Great Smith-street, London, S.W.1 (quoting No. BCD.117/8/02).

HER MAJESTY'S OVERSEA SERVICE. Government of ADEN. MEDICAL OFFICER (Special grade—Surgeon) required for surgical duties mainly and a certain amount of general duty. Must possess F.R.C.S. or equivalent. Opportunities for promotion to Specialist exist in Aden or elsewhere in the Oversea Service. Appointment can be on permanent basis with pension, or short-term contract with gratuity (taxable). Candidates in National Health Service may leave the National Health Service but retain their superannuation rights (up to 6 years) and receive a gratuity (taxable) of 20% of aggregate of salary at end of engagement. Salary scale from £1404 to £1992 a year, starting salary depending upon age and experience. Pension for permanent appointment at rate of 1/600th of final pensionable emoluments for each completed month of service. Gratuity for contract appointment is £37 10s. for each completed 3 months of service. Outfit allowance £30–£60 payable on appointment. If required to work in Protectorate an allowance of £132–£180 a year (non-pensionable) is payable. Furnished quarters at low rental. Income-tax at local rates. Free passages provided for Officer, wife, and up to 4 children under the age of 18. Education allowance in lieu of passage for children between 8 and 18 undergoing full-time education outside Aden. Tour of service from 18 to 24 months. Generous home leave granted after each tour.

Application forms from the Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/2/01).

LANCASHIRE COUNTY COUNCIL. Applications are invited from registered medical practitioners for appointment as ASSISTANT DIVISIONAL MEDICAL OFFICERS. Vacancies in or near Lancaster, Fylde, Preston, Bolton, Oldham, Stretford and Ashton-under-Lyne. Possession of Diploma in Public Health desirable. Salary £1050 rising to £1475 p.a. Travelling and subsistence allowances.

Application forms and further particulars from County Medical Officer, Serial 746, East Cliff County Offices, Preston. Application forms to be returned by 31st August, 1956.

NOTTINGHAMSHIRE COUNTY COUNCIL. Hucknall URBAN DISTRICT COUNCIL. Mixed appointment. Applications are invited from registered medical practitioners for the mixed whole-time appointment of ASSISTANT COUNTY MEDICAL OFFICER AND MEDICAL OFFICER OF HEALTH to the Hucknall Urban District. Applicants must have had at least 3 years professional experience since qualifying, be experienced in the duties of Medical Officer of Health, School Medical Officer and the care of mothers and young children, and possess a Diploma in Public Health. Salaries are in accordance with the recommendations of the Medical Whitley Council for Public Health Medical Officers holding mixed appointments, namely:—

(*a*) As Assistant County Medical Officer (32/44ths) £954 10s. 11d.–£43 15s. 0d.–£1173 5s. 11d. (on scale £1200–£55–£1475, plus loading in accordance with Spens Formula).

(*b*) As Medical Officer of Health (12/44ths) £501 16s. 4d.–£15–£561 16s. 4d. (on scale £1740–£55–£1960, plus 12/44ths of £100).

Application forms and conditions of appointment are obtainable from my office and applications should reach me by 8th September, 1956. Canvassing disqualifies.

A. R. DAVIS, Clerk of the County Council.

Shire Hall, Nottingham.

LINCOLN. COUNTY OF LINCOLN—parts of LINDSEY. ASSISTANT COUNTY MEDICAL OFFICER AND MEDICAL OFFICER OF HEALTH for the Barton-on-Humber and Brigg Urban and the Glanford Brigg Rural Districts. Applications are invited from registered medical practitioners with experience in public health work and holding a Diploma in Public Health, Sanitary Science or State Medicine for the above whole-time joint appointment. The salary which is in accordance with recommendations of the Medical Whitley Council Committee C as adopted by the County Council will commence at £1576 5s. 0d. p.a. and will rise by 3 annual increments of £58 14s. 11d., 1 of £61 17s. 5d., 4 of £34 7s. 6d., to a maximum of £1951 17s. 6d. The appointment will be subject to the Local Government Superannuation Acts, 1937 and 1953.

Forms of application and further particulars obtainable from the Clerk of the County Council, County Offices, Lincoln, to whom completed applications must be returned not later than 31st August, 1956.

H. COPLAND, Clerk of the Lindsey County Council.

STAFFORDSHIRE COUNTY COUNCIL. Appointment of ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER—South Staffs Area. Applications are invited from fully qualified medical practitioners and those holding the Diploma of Public Health will be given preference. The candidate appointed will undertake clinical work in the School Health and Child Welfare Services under the direction of the County Medical Officer of Health, and will be required to perform such other duties as may from time to time be prescribed. The salary scale is £1050–£50–£1200–£55–£1475, and increments may be given for previous similar service. The appointment will be terminable by 3 months notice in writing on either side and subject to the provisions of the appropriate Superannuation Acts and Regulations, in which connection the selected candidate must pass a medical examination and submit his or her birth certificate.

Forms of application may be obtained from the County Medical Officer, County Buildings, Stafford, to whom they should be returned when completed not later than by 4th September, 1956. T. H. EVANS, Clerk of the County Council.

County Buildings, Stafford, 9th August, 1956.

TASMANIA. Applications are invited from medical practitioners registrable in Tasmania for the position of SPECIALIST ANÆSTHETIST in the public hospitals of the North West Group. Main hospitals are The Devon Public Hospital at Latrobe, Burnie Public Hospital, and the Spencer Public Hospital at Wynyard. Devon and Burnie Public Hospitals have a Surgeon-Superintendent, Medical Superintendent, and 2 Resident Medical Officers. Applicants should possess a recognised higher qualification in the specialty. The successful applicant will be expected to provide his own car, for which an allowance will be payable, according to horsepower, when used on duty. All electric semi-detached house at Burnie available. 4 weeks annual recreation leave. Superannuation benefits. Salary from £A2318 by annual increments of £A50 to £A2568, but an appointment at the maximum figure may be made provided suitable qualifications are held. Assisted passages for appointee and family can be arranged, or alternatively, forward fares only will be refunded over a period of 5 years service with the North West Hospital Group.

Applications in duplicate to the Agent-General for Tasmania, 457, Strand, London, W.C.2, by 25th August, 1956, from whom further details may be obtained.

THE MEDICAL SERVICE OF THE ROYAL NAVY

VACANCIES FOR MEDICAL OFFICERS

Candidates are invited for Short Service Commissions of 3 years, on termination of which a gratuity of £450 (tax free) is payable. Ample opportunity is granted for transfer to Permanent Commissions on completion of 1 year's total service. Officers so transferred are paid instead a grant of £1500 (taxable).

All entrants are required to be British subjects whose parents are British subjects, to be medically fit, and to pass an interview.

Full particulars from the Admiralty Medical Department, Queen Anne's Mansions, St. James's Park, London, S.W.1.

REGIONAL MEDICAL HEALTH OFFICERS

required by the

SASKATCHEWAN DEPARTMENT OF PUBLIC HEALTH

Salary—$8112–$9588 p.a.

Duties—To perform professional medical and administrative work as Medical Health Officer in an organised Health Region with a population of approximately 50,000, to develop regional preventive health services and a general public health programme.

Requirements—Graduation from an approved Medical School; some medical and administrative experience. Diploma or Master's Degree in Public Health desirable but not essential.

Benefits—3 weeks annual vacation with pay; 3 weeks sick leave, accumulative, with pay; suitable superannuation scheme. Opportunity is available for assisted postgraduate training.

For application forms contact Public Service Commission, Legislative Building, Regina, Saskatchewan, Canada. For further information write to Personnel Officer, Department of Public Health, Provincial Health Building, Regina, Saskatchewan, Canada.

WESTERN REGION OF NIGERIA.

(1) SPECIALIST OBSTETRICIANS required for obstetrical and gynæcological duties, including outpatient, maternity, child welfare and ante-natal work in the larger provincial hospitals of the Region (which are being enlarged up to 200 Beds), and to assist in training midwives. Candidates should have registrable medical qualifications and the M.R.C.O.G., with considerable experience of major surgery in their specialty, and have had at least 6 years post-registration experience.

(2) SPECIALIST RADIOLOGIST required to give advice on radiological equipment of hospitals in the Region, advise and assist medical officers in the interpretation of X-ray films, travel in the Region supervising the work of X-ray Technicians and Radiographers, and be responsible for the ordering and supplying of departmental X-ray stores. Candidates should possess registrable medical qualifications and the D.M.R.D. plus 4 years experience in their specialty.

Appointments may be :—

(*a*) From the National Health Service. Candidates may leave the National Health Service but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of their salary, or

(*b*) On short-term contract (1 tour in first instance of 12–24 months duration according to age).

Salary under (*a*) £2220 a year, and (*b*) £2448 and gratuity (taxable) on satisfactory completion of contract at rate of £37 10s. for each completed period of 3 months service (including leave). Officers appointed under (*b*) required to contribute to Widows' and Orphans' Pension Scheme. Quarters provided at low rental. Taxes at local rates. Annual leave permissible: generous home leave granted after each tour of 18–24 months. Free return passages for Officer, wife, and children (up to 3).

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/410/06).

General Practice

For an Executive Council post (England and Wales) apply on form E.C.16A *obtainable from the council. Mark envelope "Vacancy."*

BOWNESS-ON-WINDERMERE. Applications are invited for VACANCY (rural). List at present approximately 815. Residence and surgery may be available on lease. Apply on Form E.C.16A to the undersigned within 14 days after the appearance of this advertisement.

W. TOWNLEY COTTAM, Clerk,
60, Highgate, Kendal. Westmorland Executive Council.

SILLOTH, CUMBERLAND. Applications are invited for VACANCY (mixed urban and rural) owing to resignation of practitioner. List at present date approximately 2185. Intermediate area. Residence and surgery available. Apply on Form E.C.16A by 27th August, 1956, to—

F. M. SMITH, Clerk to Cumberland Executive Council.
7, Chatsworth-square, Carlisle.

Hospital Services : Non-Medical Appointments

NEW END HOSPITAL, N.W.3. Applications are invited from TECHNICIANS (Associate I.M.L.T. or equivalent) with experience in Clinical Biochemistry for a post now vacant in the Biochemical Laboratory of the Department of Endocrinology, New End Hospital. Salary according to Whitley scale.

Detailed applications, naming 2 referees, to Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6, within 10 days.

CHELMSFORD HOSPITAL MANAGEMENT COMMITTEE. PRINCIPAL BIOCHEMIST (non-medically qualified) required for newly built Group Pathological Laboratory at the Chelmsford and Essex Hospital.

Applications, giving the names of 2 referees, by 1st September to Group Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford, Essex.

Miscellaneous

Dr. Barnardo's Homes. 2 Women Medical Officers required as follows :—

(*a*) Attached to Headquarters staff. Chief duties visiting and inspection of branch homes and supervision of foster children's medical records.

(*b*) House Officer at the Australasian Hospital and Village Home, Barkingside.

Salary scale £750–£1150. Posts vacant 1st October.

For further details apply to Chief Medical Officer, 18, Stepney-causeway, London, E.1.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimen of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

Microscopes. Highest prices paid for good modern types. Send or bring your equipment for valuation.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

The British Journal of Medical Hypnotism. Quarterly, £1 1s. p.a.—Orders to the publishers, 4, Victoria-terrace, Hove, 3 Sussex.

Portable X-ray set (fairly modern and compact) required for clinical research work in radiographing premature babies.—Full particulars to Supplies Officer, Lewisham Hospital High-street, S.E.13.

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Printed by HAZELL, WATSON & VINEY, LTD., London and Aylesbury—Saturday, August 18, 1956.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

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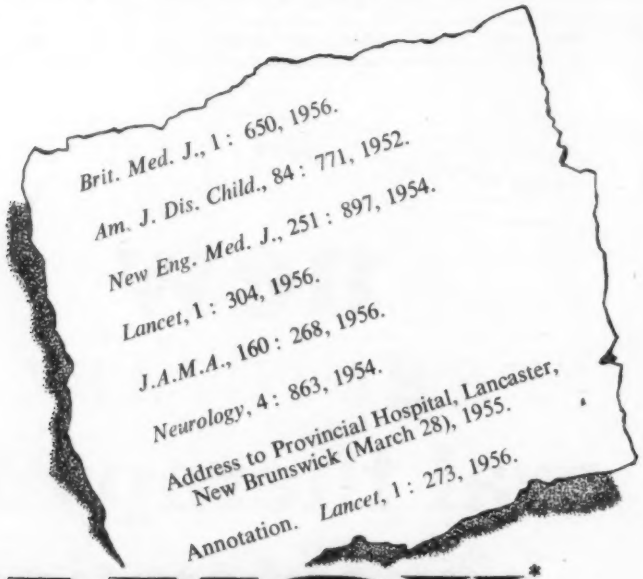
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ACETAZOLAMIDE

IN EPILEPSY

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The mounting evidence on the value of DIAMOX Acetazolamide indicates that the drug has considerable potentialities in epilepsy. Different workers have found that the drug shows marked seizure-controlling properties in a high proportion of patients treated. For example, of 70 patients treated with DIAMOX after resisting every other form of drug, only 2 showed no improvement. (*Lancet*, 1 : 304, 1956.) DIAMOX has given good results in epilepsy when used alone and in combination with other anticonvulsants. Its freedom from side effects appears to be a regular feature in published reports on the subject.

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